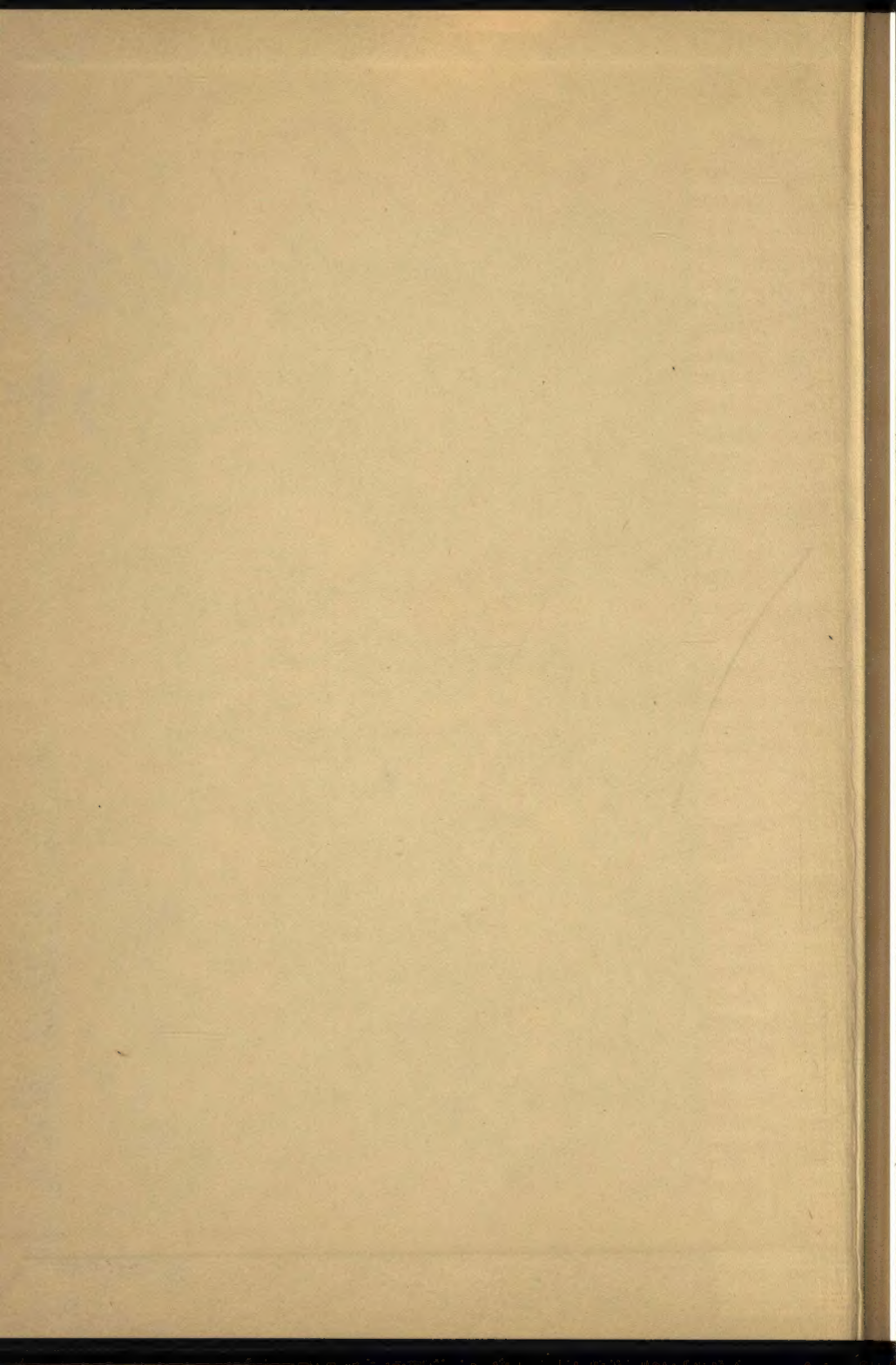


HOW TO BUILD CABINS AND RANCH HOUSES





HOW TO BUILD CASINOS AND RANCHO HOUSES

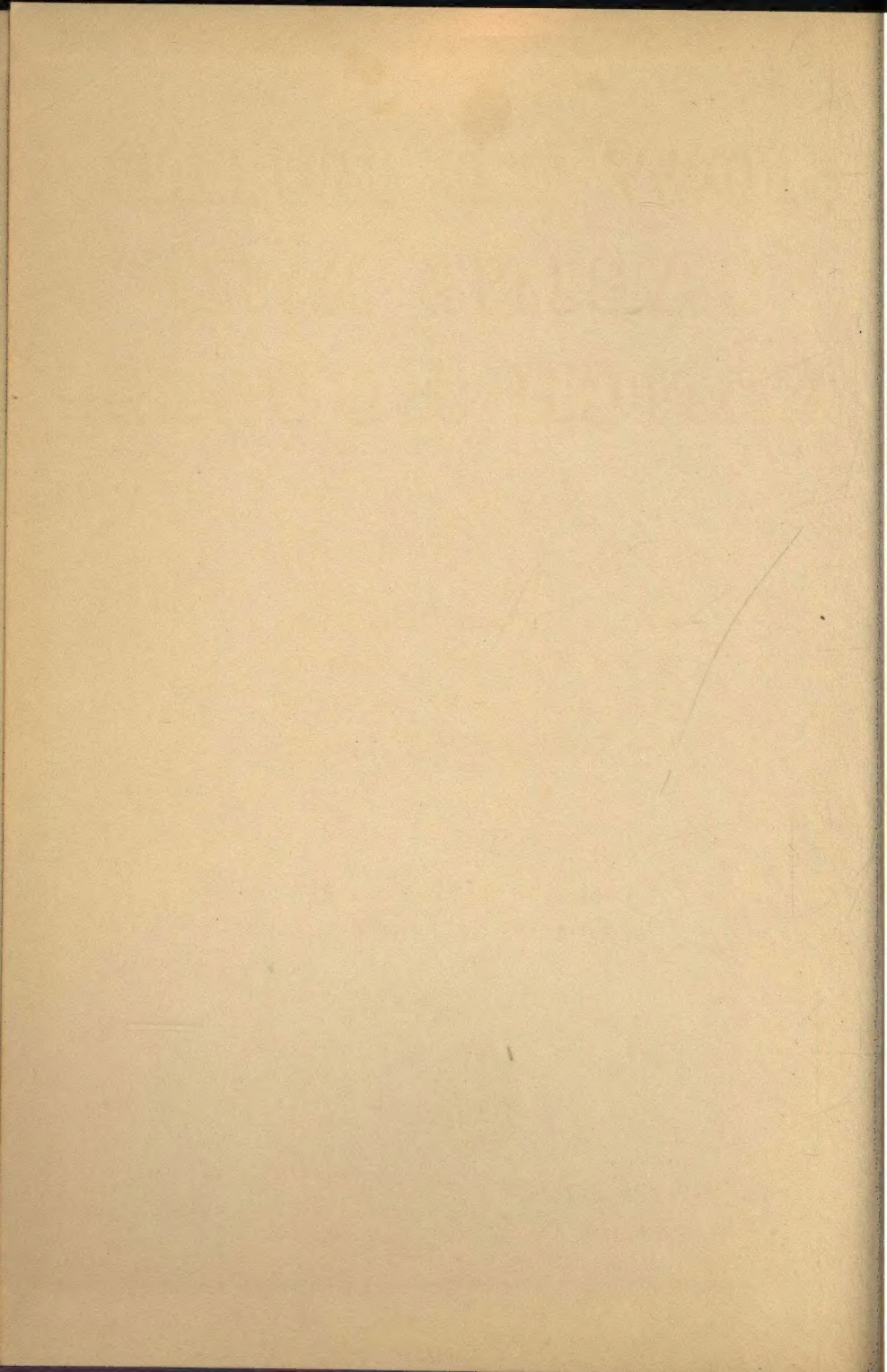
THE COMPLETE INSTRUCTIONS
FOR BUILDING A CASINO
AND RANCHO HOUSE
WITH A COMPLETE
AND DETAILED PLAN

Published by the
The Complete Building Guide



THE COMPLETE BUILDING GUIDE
PUBLISHED BY THE
THE COMPLETE BUILDING GUIDE





HOW TO BUILD CABINS AND RANCH HOUSES

WITH COMPLETE DIRECTIONS
AND PLANS FOR INTERIORS,
FURNITURE, LANDSCAPING
AND MODERN IMPROVEMENTS

Prepared by the Editorial Staff
of Popular Science Monthly



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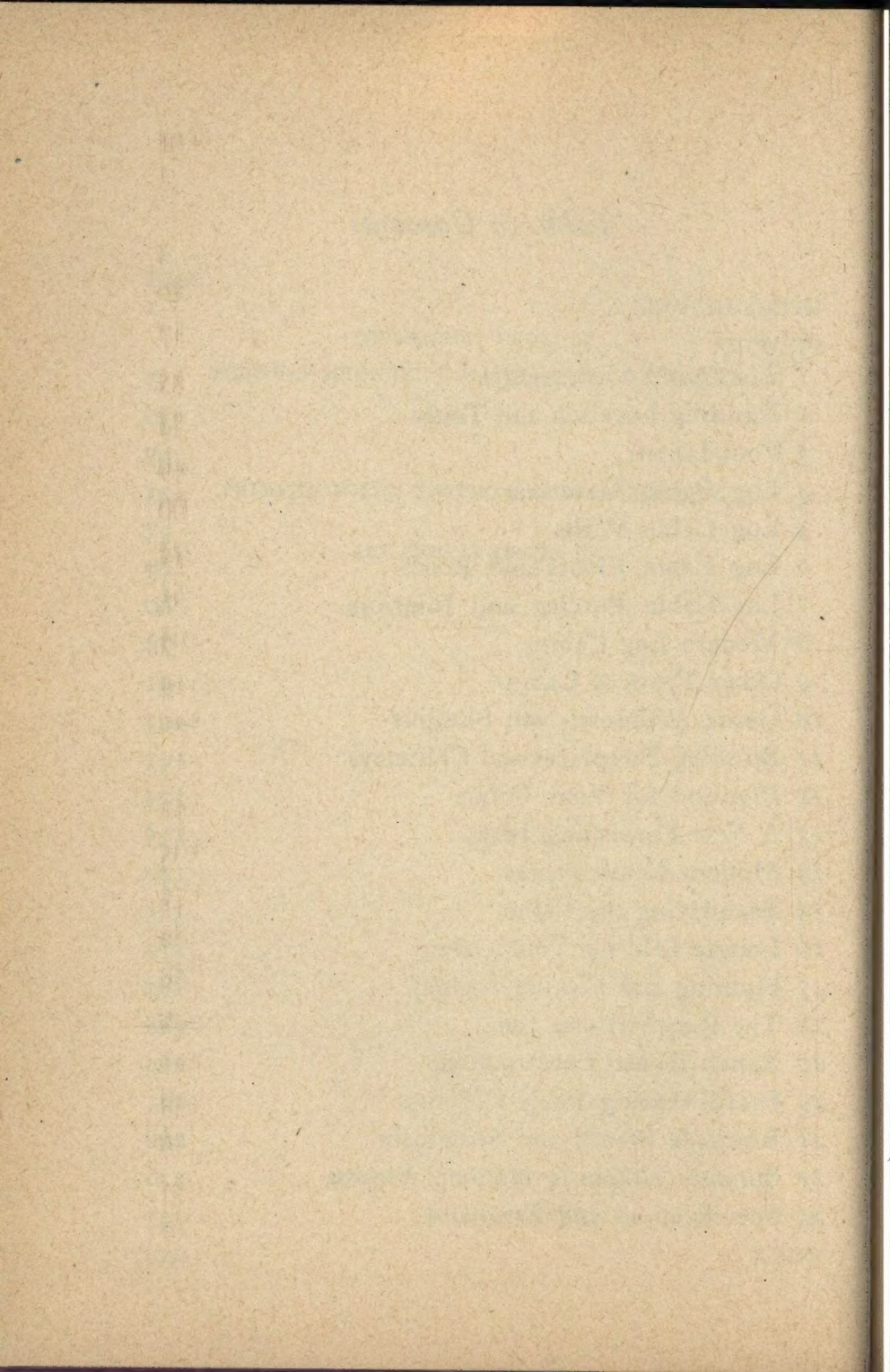
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Introduction

NOTHING could be more American than the simple cabin. Not many generations ago, it was the backbone of American life, the headquarters of that important unit, the home. It provided shelter, protection, and a foundation upon which to build a great nation. The pioneer cabin was, in other words, a necessity.

Today's descendant of the pioneer cabin can be just as truly a necessity. Disregarding the cabins that still are used as permanent homes in some sections, there remain the recreational cabins and their near relatives, the hunting and fishing lodges and summer cottages and bungalows. In some respects these are recreational luxuries. But to the owner whose normal activities make it impossible for him to lead the "leisurely" life of the cabin owner of two or three hundred years ago, a vacation cabin is a genuine asset. Also a cabin can be a real health investment. If you doubt this, try erecting one with your own hands, and note how your tensions vanish and your digestion improves. You will find that you never had so much fun in your life. Moreover, the fun of spending a few days or weeks now and then in your cabin is something that can be enjoyed through many years. A cabin and the land on which it stands may represent an investment of relatively few dollars. Over a period of a few years, that will be returned to you in many ways, not the least of which is the saving of actual money that would have been spent on other forms of vacation activities. Suit-

INTRODUCTION

able cabin sites, near streams or lakes or in the mountains, can be bought cheaply. A fraction of an acre is sufficient. If you live near a National Forest, the United States Government will let you erect a cabin on a delightful spot, for a fee of a few dollars a year. Similar summer-home sites can be obtained in various state parks.

If you do not want to build a cabin or lodge for yourself, perhaps you can find profit and pleasure in erecting such structures for others. It is not every man who can find time to construct his own vacation home, so he must pay some one else to do it. That some one else could be you.

It is the purpose of this book to set forth a number of ideas that will be helpful to the vacation-home builder. An attempt has been made to give information of a fundamental nature. During the actual building of a cabin or similar structure, unforeseen difficulties will arise, which must be solved on the spot. That is true of any type of building, particularly where the builder is not a contractor of long experience. Although numerous floor plans and other details of design are illustrated, there is no necessity to cling doggedly to them. The creation of a cabin is a relatively simple matter, and one that permits much flexibility both in design and construction.

The ranch house has come into widespread popularity as a home particularly suited to suburban and rural sites. On a small and simplified scale, this type of structure could well serve as a vacation cabin or lodge. After all, the ranch house is, in many ways, a near relative of many a rustic cabin . . . low-pitch roof, one-story construction, often a covered porch running along one side, absence of basement, and the use of ordinary structural materials in a simple, effective way.

It is desired to express appreciation to the various government organizations, lumber associations, manufacturers and others for their invaluable assistance in providing some of the information and illustrations used in this book.

Chapter 1

THE CABIN MOVEMENT

THE word "cabin" will be used throughout this book to designate a simple structure primarily intended for recreational purposes and part-time occupancy. It will be one story high, in most cases; will consist of one, or at most three or four, rooms; seldom will have a foundation other than a few stone or concrete piers, and will be capable of being built by the amateur. A cabin will be considered as having a number of relatives, structures whose design and construction are fundamentally alike, which are neither elaborate nor relatively expensive, and which can be built by anyone.

First and most important is the log cabin. Because the log house is so firmly rooted in American history, it will be a long time before, in the mind of the average American, any other structure can replace it as a symbol of primitive comfort. Frequently the person who conceives the idea of building a summer or vacation home thinks first of a log cabin, and may try to obtain that type in preference to any other. Unfortunately, the scarcity of logs and cost of labor in some sections make it necessary to choose a substitute. Also, the pioneer who knows all about log-cabin building from boyhood experience cannot be found in every home or community, and the novice is hesitant about tackling anything that looks as formidable as building a house of logs.

In reality, the erection of a log cabin is not difficult, and need not be costly. When it is properly put up, its builder has something that will last for years, perhaps for generations. Considerable space is given in this book to log cabins.

CABINS AND RANCH HOUSES

This is primarily because the log structure can be used as a basis for so many other types. For instance, there is on the market a log siding or weatherboarding that permits the construction of faithful imitations of log houses. So if real



Substantial cottage, showing the best manner of making corner joints.
Casement window opens out flat against the wall.

logs are not available, the vacation cabin can be a wooden framework covered with this type of material, without lacking much of the charm of a real log house.

Log siding of wood such as pine and redwood consists of interlocking boards so milled that their outer surfaces are curved, like sections ripped from real logs. Such boards lend themselves to a wide variety of uses. They can be employed outside to simulate logs laid horizontally or vertically, and on the inside for creating distinctive wall sur-

THE CABIN MOVEMENT

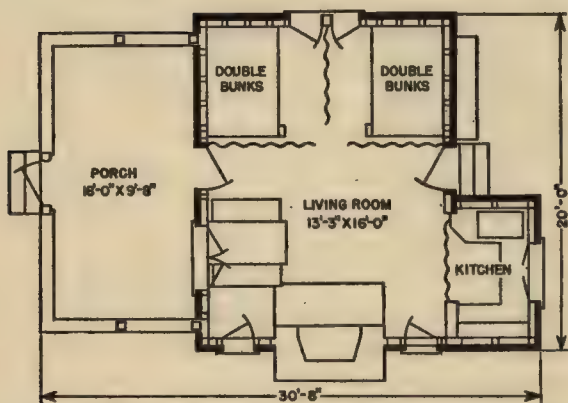
faces. Log siding can be stained, painted, varnished, or left to weather naturally. It resists decay, either because of inherent properties or because of treatment given it during manufacture. A modernized log cabin consists of a framework of 2 by 4's and similar sawn timbers, covered outside and perhaps inside with log siding. This siding is made in various widths, so that it can be applied in random fashion to give still more realistic imitations of log walls.

Another type of log cabin of interest to the modern owner is the pre-cut variety. Real logs, usually cedar because of that wood's resistance to decay and insect attack, are employed. The corner notches and other constructional details are cut at a mill. The logs arrive at the cabin site ready to erect without laborious chopping and sawing. Some companies provide expert supervision or labor when the customer desires it, and deliver the cabin complete, even to furniture.

Hunting and fishing lodges may be of logs or of simple frame construction, with an outer wall covering of almost anything from log siding to plain boards set horizontally or vertically. Such lodges may consist of a single room or a group, with cooking and bunking facilities arranged to make the most of the space available. Sometimes a type of construction is used that permits the lodge to be torn down and moved to another location. This is a valuable feature because a good hunting or fishing locality may not always remain that way. A hunting or fishing lodge does not differ fundamentally from a simple cabin, tourist home, or summer cottage, so that designs for these structures may be used interchangeably.

Bungalows and summer cottages may be of logs, but more frequently are frame structures with outer wall surfaces covered with log siding, plain siding, shingles, or plain boards arranged in a pleasing manner. They can even be of stone, when such construction is economically possible. Rammed

CABINS AND RANCH HOUSES



Simple cabin with kitchenette. This makes an especially attractive summer home. The floor plan shows the disposition of inside space.
(Courtesy, Shevlin Pine Sales Co.)

THE CABIN MOVEMENT

earth and adobe bricks are cheap but not widely-used types of wall materials that might be employed.

Because the motorist of today demands something better than a tent and cheaper or more convenient than a hotel, tourist cabins have become a familiar sight along our highways. A really attractive tourist home will pay for itself quickly if it is built at a strategic point. The same fundamental designs employed for vacation homes can be utilized for tourist purposes, with some alterations in interior arrangement and perhaps in size.

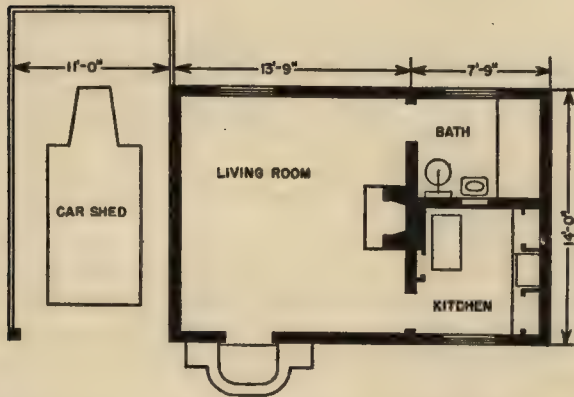
Wayside stands, where farm products and refreshments are sold to motorists, are offshoots of the genuine cabin. Their construction is not essentially different. Provide any simple cabin with an open front, a counter, and perhaps a projecting roof, and you have a wayside stand.

Whether you are building a hunting lodge or a wayside stand, strive above everything else for attractiveness and sound workmanship. The highways and hills and woods are cluttered with eyesores—dumpy-looking shacks, once smeared with gaudy paint and then left to shift for themselves. The builders apparently had no eye for pleasing appearance, and were ignorant of the fact that such structures repel rather than attract. For instance, the wayside stand that looks like a squatter's shack is more likely to drive customers away than to attract them.

This matter of attractiveness is of prime importance when the cabin is in the city or suburbs. Yes, log cabins are erected on city lots. They are used as garages, workshops, guest houses, stores, and lunch rooms. Attractive city cabins have been built of discarded poles purchased from a local telephone or electric company.

Another city use for the log-cabin idea is the cabin room located in a residence or public building. A million-dollar Y. M. C. A. building in a large city has a log-cabin room for the use of its younger members. The walls are built of real

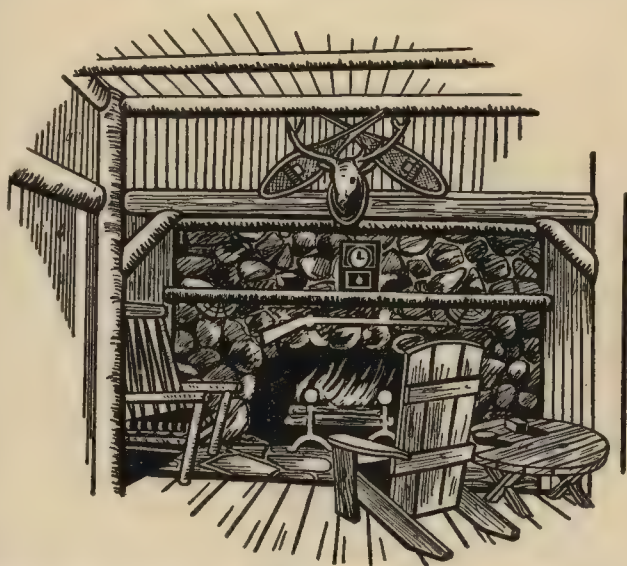
CABINS AND RANCH HOUSES



Cottage built of sawed lumber. It makes a desirable hunting lodge or vacation cabin. Its simplicity is evident in the floor plan. Bunks can be built around living room; or the car shed can be enclosed and converted into one or two bunk rooms. (Courtesy, Shewlin Pine Sales Co.)

THE CABIN MOVEMENT

logs, and there is a massive field-stone fireplace. It is an experience to be remembered to step from the cold, severe hallway into this delightful room that harks back to the days of buffalo hunters and Indians. The basement recreation room or the den in any part of the home can be made



One way of finishing the interior of your cabin. Note the stone fireplace, rustic furniture, and undressed logs.

a replica of the interior of a real log cabin, by using genuine logs or log slabs for the walls and ceiling. Another pleasing treatment is the use of log siding on the walls. Such rooms should, of course, contain massive fireplaces of natural or field stones, and be furnished with rustic chairs, benches, tables, and lighting fixtures. So if you cannot build a cabin in the woods, you may want to do the next best thing and tuck one away somewhere in your home. It will, at least, help you imagine that you have escaped from the rigors of everyday life!

Chapter 2

BUILDING LOCATION AND TOOLS

UNFAVORABLY located, the finest cabin in the world will be a disappointment. Selecting a site is a matter of great importance. For summer-home use, some of the factors affecting the location include accessibility, drainage, water supply, cooling breezes, wooded areas, lakes, streams, the view, and afternoon shade. Some thought may be given also to the safety factor: the nearness of dangerous cliffs, avenues of escape in event of a forest fire, flood menace, and protection from storms.

Although it is desirable to have a vacation retreat far from any road, you must consider the matter of accessibility. In the first place, materials used in construction must be hauled to the site. Later, guests and supplies must be transported to the cabin, usually in automobiles. Keep in mind the fact that roads and trails that are excellent in dry weather may become impassable when it rains, or during winter months when the ground is not frozen.

It is a frequent practice to place a cabin on a hillside, where it nestles snugly against the earth, protected from storms by trees and elevated ground. Unless care is exercised, the cabin owner may awake some stormy night with the impression that he is on a houseboat. Sites in the direct path of wet-weather streams and drainage ditches should be avoided. To take care of normal drainage, grade the area around the cabin so that water runs away from it. Between the cabin and area from which water is likely to flow, create a water barrier. This can be a shallow ditch, a masonry wall,

BUILDING LOCATION AND TOOLS

or a basin formed by filling in around the cabin. Water should be able to escape from the barrier by flowing around the cabin yard.

To assure health protection, make certain that the water supply is adequate and safe. It seldom is safe to use water from streams. Springs are satisfactory if there is no seepage of waste matter into them from above. A dug or drilled well is perhaps the best form of water supply. But whatever



In preparing the logs for your cabin, two men with a crosscut saw can do the work. Portable chain saws driven by small gasoline engines will save time and labor.

the source, it will pay you to have the water tested once or twice a year. In most states, this will be done by the county or state health department without charge. You simply procure a sterilized bottle from the local health officer, fill it with the water, and mail it to the place designated. When you cannot procure water of certain purity, treatment with chlorine tablets, by boiling, or in some other manner may be necessary. Your health department should be able to advise you about this.

The location of porches and other matters of orientation will be determined largely by the direction from which cool-

CABINS AND RANCH HOUSES

ing breezes blow, points from which the most beautiful scenery can be enjoyed, position of shore of lake or stream, and the presence of large trees or other natural formations.

From the standpoint of safety, it would be unwise to build a cabin on the brink of a cliff, or at a point where a dangerous rock formation or steep slope must be negotiated to reach the site. Do not place the building under a leaning or decayed tree that might fall. Avoid overhanging rocks and



Logs can be dressed to any shape desired by using a sharp ax. They should be firmly supported so they will not roll.

earthen banks. Make inquiry about the height of flood waters from near-by streams and note whether the site is in a pocket that might become a lake if the rainfall is heavy. In mountainous country, the danger of snow slides and landslides must be taken into consideration.

Another important factor is sanitation. Outside toilets should be placed in a secluded spot not too close to the cabin, and should be below the level of springs, and at least 100 feet away from all sources of drinking water. Do not place the toilet near the main roadway or approach to the cabin.

BUILDING LOCATION AND TOOLS

These suggestions apply to chemical toilets, pit toilets, septic tanks, and garbage pits.

When erecting a cabin, keep in mind the fact that you may want to enlarge it later. Because of its informal and rustic nature, the average cabin can ramble all over the place and still look attractive. It is better, however, to follow some definite plan, and to leave space for possible later additions.

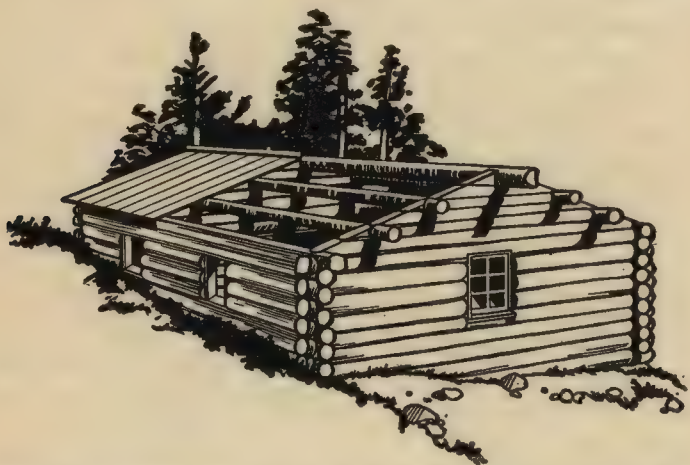
Preserve, as far as possible, the natural appearance of surroundings. Let all trees stand, except the dead ones, and refrain from trimming off limbs that are close to the ground. Clear away only the underbrush and shrubbery where absolutely necessary. Usually the landscaping can be improved by transplanting shrubbery so as to create natural screens separating the cabin from the roadway or from other cabins, to conceal outbuildings, and effect other improvements. When fences are built, they should be of rough poles, to preserve the rustic appearance of the surroundings. The same applies to outdoor furniture, boat docks, etc.

When selecting the site for a cabin, it may pay you to study carefully the local weather or climate angle. If the cabin is to be used in winter, you can take advantage of whatever sunshine there is by placing it on a southern or southeastern slope and by putting the biggest windows in the south side to admit sun. (Curtain them when no sun is shining.) The air usually is cooler toward the bottom of a slope than at the top, a fact especially noticeable in summer. Also, it usually is damper at the bottom, where breezes are less likely to reach. In summertime, the heat most likely to make you uncomfortable is that coming from the sun in the afternoon; so a location where the cabin will be shaded on the west side is desirable. Large trees, a cliff or high hill, or a man-made wall or lattice can provide the shade. A tree or vine that sheds its leaves in winter so the sun can get through it is useful as a source of summer shade on the southern side of the building.

CABINS AND RANCH HOUSES

TOOLS FOR CABIN BUILDING

The matter of tools is not a difficult one to solve, when it comes to the actual erection of a cabin. A log house, being primitive in nature, can be built with the aid of only an ax and a crosscut saw. However, some elaboration on these fundamental tools is desirable. An adz may be helpful. Old-time cabin builders used a broad-ax for hewing logs flat. If you cannot procure a broad-ax, either a broad hatchet



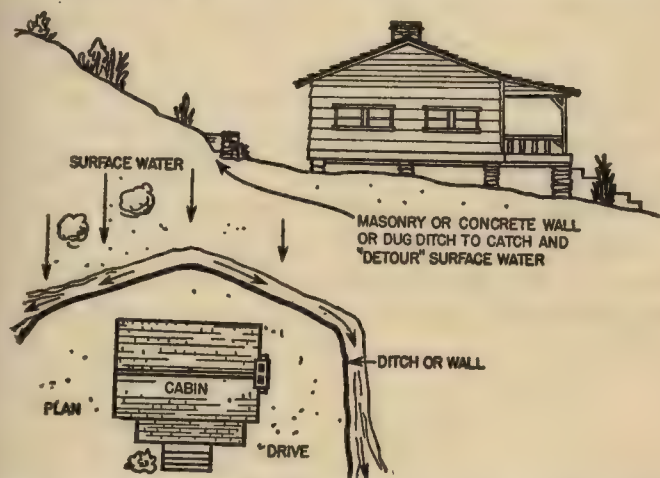
This is a bad location for a cabin as the hillside drains water into the site. Also, the bottom logs are in contact with the ground.

with 5- or 6-in. blade, or an ordinary ax can be used for hewing. A wide blade is necessary in order to produce a smooth surface.

A shingle-splitting tool (the froe) was employed a great deal in earlier times, but you probably will buy your shingles or other roofing material. For cutting logs, a two-man crosscut saw is desirable. You will find it wearisome to work logs with a hand-saw although such a tool is useful when handling small poles, framing windows and doors, etc. A heavy

BUILDING LOCATION AND TOOLS

hammer is necessary for driving spikes. Some forms of construction require that the logs be nailed together at intervals, the spikes being driven through holes bored part way through them. For this purpose an auger for making the holes, and a bar or rod of iron a foot long and about $\frac{5}{8}$ in. in greatest diameter to serve as a giant nail set, are used. A sufficiently strong block and tackle can be used to raise logs



Here is a better site as the drainage is away from the cabin. Note the building is set on concrete or stone supports and a restraining wall diverts the water from the hill.

into place on the wall. The upper pulley can be mounted on a tripod made of poles, or attached to the part of the wall already in place or to a cable stretched between nearby trees. With this useful device, two men can put up a cabin that, without it, would require a half-dozen or more men working with forked or pointed poles. You will need a small trowel for chinking cracks between logs.

For building other types of cabins from mill-sawed lumber, the usual assortment of carpenters' tools is required. These include hammer, rip and crosscut hand saws, hatchet,

CABINS AND RANCH HOUSES

steel tape, steel square, plumb line and bob, level, chisels, plane, and so on. Sectional or ready-cut cabins, which can be purchased from some dealers, require to erect them little more than a hammer, and perhaps a wrench for tightening nuts on bolts.

If you go into the business of building vacation cabins and lodges, you will find a power saw, with a jointer unit attached, a great convenience, and at least as serviceable as an extra helper. An 8- or 10-in. circular saw on a suitable stand does not cost a great deal. With it you can rip, crosscut, dado and otherwise process stock in excess of 2 in. thick. The jointer, preferably the 6-in. size, is used for smoothing edges and surfaces of boards. Where electricity is available, a power hand (circular) saw and a $\frac{1}{2}$ -in. portable electric drill can be used to lighten the work. When no power lines are near, a small gasoline engine will drive such tools as the jointer and non-portable circular saw.

Chapter 3

FOUNDATIONS

LIKE the chain that had a weak link, more than one log cabin or summer bungalow has had its life shortened by a poor foundation, or no foundation at all. Builders of log cabins sometimes lay the sill logs directly on the ground—an excellent way to make wood decay. Moisture collecting between the wood and earth creates conditions ideal for the growth of decay-producing fungi. Hence a log cabin built flat on the ground will, in a few years, start to fall apart. The same applies to any other kind of structure. In addition to decay, there are certain insects, such as termites, that delight in finding a building with no foundation.

A common form of support for cabins consists of piers made of two or more flat stones laid one on the other. A single stone is not much better than no stone at all, because moisture can still reach the wood and cause decay to set in. When two stones are used, the joint between them stops the rise of moisture and the top stone will remain dry. Do not cement the stones together.

Another support that has been used, but which is not as durable as stone or concrete, is a post of cedar or other wood. The heartwoods of some species, such as cedar, cypress, locust, and redwood, have sufficient natural resistance to decay and insect attack to permit their being used without particular protection. Other woods should be creosoted, and it is not a bad idea to use a coal tar creosote on the woods that are naturally resistant.

Creosote can be applied hot or cold with a long-handled

paint brush or a small, soft-bristled broom. 1—Hot brushing method: Heat the creosote in a large pail or kettle until it is very hot but not boiling (about 200 degrees Fahrenheit). Do not let it boil over and become ignited. An open fire, with the creosote container supported on a grate or hung from a crane, can be used, if reasonable care is exercised. Apply two coats of the preservative, letting each one dry well. Flow the creosote over the wood, and work it into every crack and hole. After the wood is treated, handle it carefully so as not to break the protective layer. This method of applying creosote can be used for other parts of a building. 2—Cold brushing method: Use creosote thin enough to penetrate the wood at ordinary temperatures, and apply it with brush or broom, working it into all crevices, etc. 3—Cold soaking method: Immerse ends of piers in a barrel of creosote for 12 hours or so, to a depth a few inches greater than the amount they will be buried in the ground. 4—Hot-cold method: This widely-used treatment consists of soaking the wood for a number of hours in hot creosote and then transferring it to cold creosote for a similar period.

Upper ends of piers can be treated in the same manner as the lower ends: and any remaining surface can be brush-coated. In all "brushing" treatments, the preservative should be applied liberally, the brush serving as a tool for flowing it over the wood and into all cracks and holes.

Posts used as piers should be about a foot in diameter, and long enough to extend a yard or so into the ground. At the bottom of the hole dug for such a pier, place a flat stone, somewhat larger than the post, to form a footing.

Perhaps the best pier is made of reinforced concrete or of stone-and-cement masonry. It should extend below the frost line, or preferably down to solid rock or dense gravel.

For a concrete pier not resting on rock, first dig a hole about 24 in. square, and deep enough to extend below the frost line. If the house is to rest but a few inches above the

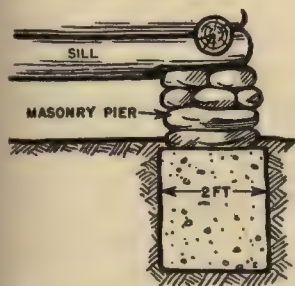
FOUNDATIONS



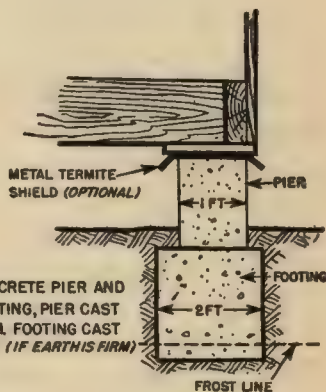
- 1 WHAT NOT TO DO. LOGS IN CONTACT WITH EARTH WILL DECAY



- 2 SATISFACTORY PIER... PARTICULARLY FOR TEMPORARY STRUCTURES. USE OF TWO ROCKS KEEPS MOISTURE FROM WOOD

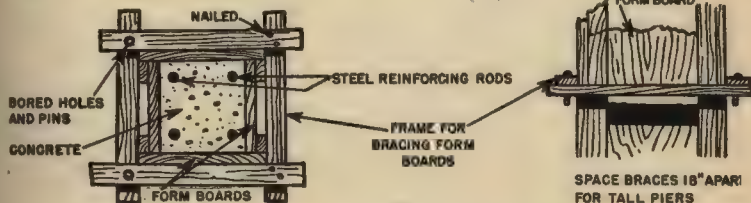


- 3 FOOTING OF MASONRY CONCRETE OR LOOSE STONE



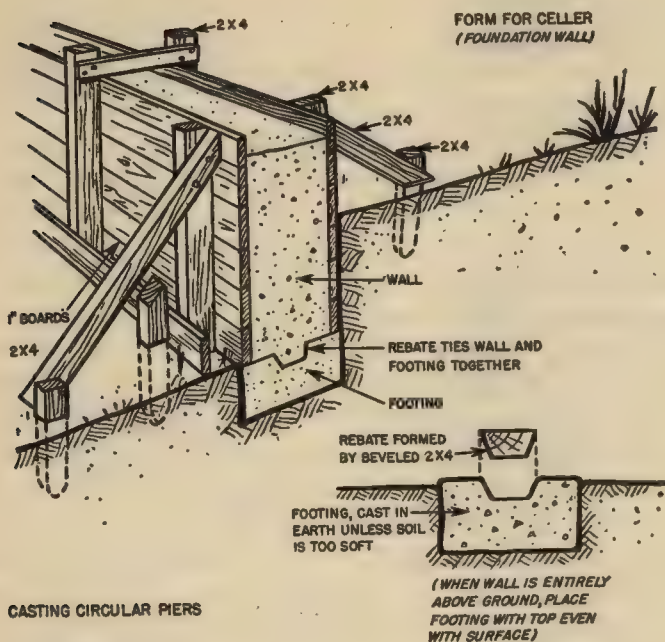
- 4 CONCRETE PIER AND FOOTING, PIER CAST IN FORM. FOOTING CAST IN HOLE (IF EARTH IS FIRM)

- 5 PIER AND FORM (PIER IN CROSS SECTION)

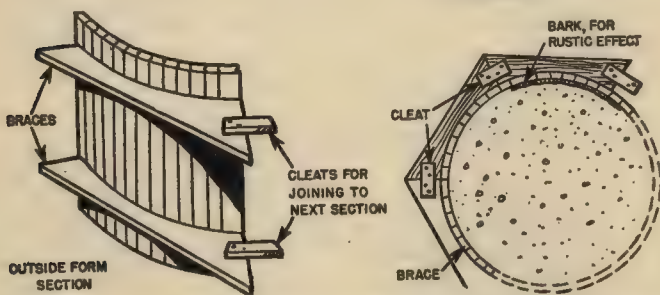


These illustrations show, first, how *not* to lay the bottom logs of your cabin, and then various proper methods that will insure long life to a cabin's foundation.

CABINS AND RANCH HOUSES



CASTING CIRCULAR PIERS



The illustrations at top show how the foundation wall for a cellar is built. Lower drawings show manner of casting circular piers for use in foundations.

FOUNDATIONS

ground, build forms of 1-in. lumber that reach to the bottom of the hole and extend for the required distance above the ground. Another way, which saves form lumber, is to extend the boards just far enough below the ground surface to prevent the concrete from escaping beneath them. Use a 1:2:4 mixture of concrete to fill the form. That is, mix 1 part by volume of Portland cement, 2 parts coarse, clean sand, and 4 parts gravel or broken stone. Add water until the concrete will just flow—until it is about the consistency of mush. It is not a bad idea to reinforce the piers by inserting four $\frac{3}{4}$ -in. steel bars, arranging them near the corners and tying them in position with heavy iron wire.

If the pier is to extend for a considerable distance above the ground, as it will on the lower side of a sloping site, the following method of pier construction can be employed: First make a footing by digging a 2-ft. square hole below the frost line and filling it with concrete to within 6 inches of the surface of the ground, using the mixture given. Then, with flat boards, build a form for a post 1 ft. square, extending from the base to the desired height. Brace it with outside frames every 18 in. Insert four reinforcing rods, placing them 2 in. or so inside the corners, and tying them together at 12-in. intervals with heavy wire or $\frac{1}{4}$ -in. rods. You can fasten these rods to the larger ones with baling wire or similar small wire. Extend cross rods at intervals until their ends touch the form so that the reinforcing network will be held away from the wood. Fill the form with the 1:2:4 concrete mixture, tamping it in place with a paddle, and manipulating it so that the large pebbles or rock pieces do not remain near the surface. Let the pier set for several days before starting the cabin structure.

When it is desired to preserve the rustic atmosphere demanded by some types of cabins, particularly log ones, the discordant note introduced by square, plain concrete piers can be eliminated by some form of camouflage. Shrubs can

be planted where they will hide the piers from view, or Virginia creeper or other vines can be placed so they will grow over the concrete. For a log house, the piers can be made round, and the concrete painted or otherwise colored to harmonize with the logs. For instance, a chocolate brown, which will not produce a discordant note with rustic construction, can be made by mixing burnt umber with the concrete in about the proportion of 4 lbs. of umber to every 100 lbs. of cement. The ingenious craftsman can make artificial concrete logs by lining cylindrical forms with bark placed with the rough side next to the pier material. Still another expedient is to apply strips of bark to the exposed surfaces of ordinary piers, fastening the pieces with wires or by using nails that will penetrate concrete.

If you prefer a stone pier, first make a concrete footing as described or else a loose stone footing. This latter type is made by digging a hole about 2 ft. square to a depth of about 3 ft., and filling it with pieces of stone carefully arranged and compacted so that they will not compress when weight is applied. A loose stone footing can be used beneath concrete piers or flat stones.

After the footing is in place, lay up the stones with cement mortar. Whole or split field stones, those gathered from beaches, or quarried sandstone can be used. The mortar is made by mixing water with Portland cement and sand combined in about the proportion of 1 part cement to 3 or 4 parts sand. The addition of a little hydrated lime will make the mortar easier to work: a suitable mixture consists of 6 parts cement, 24 parts sand, and $\frac{1}{2}$ to 1 part lime. (Use a cement-sand mortar for chimney and fireplace construction.) Ready-mixed mortars are available at building-supply dealers. Wet the stones before applying mortar.

Spacing of piers should be in proportion to the load carried. For log cabins, the supports should be placed at every corner and at intervals of 6 ft. or so along the walls. Lower

FOUNDATIONS

parts of the sill logs are hewn flat at the points where they rest on the piers.

Where the strongest, most uniform support for cabin walls is desired, and the added cost is not prohibitive, solid concrete or masonry foundation walls can be used instead of piers. If masonry is used, make sure that the walls are sufficiently massive, that mortar joints between stones do not form continuous lines that might crack open, and that solid stones or bonds extend all the way through the wall at intervals, say one stone for every 8 sq. ft. of wall surface.

Concrete walls for log cabins, according to recommendations of the U. S. Department of Agriculture, should be 2 or 3 in. thicker than the width of logs used for the sills and walls, and in no case less than 8 in. thick. Width of the footing or bottom of the foundation will depend to some extent on the nature of the soil, but generally should be 8 in. wider than the wall thickness. If the soil is very soft, a still wider footing may be necessary, or piers may be extended down at intervals to bedrock or denser soil or gravel strata. Inspection of other buildings in the vicinity will reveal much about the type of construction demanded by conditions.

Whatever the type of foundation, it is essential that proper ventilation be provided beneath the floor, to prevent decay of sills, joists, and other wood parts. Some cabin owners block the spaces between piers with masonry, lattice work, shingled panels or other construction, to improve appearance. This is permissible provided ventilating openings are left. These can be 4 x 8 in. screened holes spaced a few feet apart, the screens serving to exclude insects and small animals. When a cellar is built, the walls can be solid except for the normal window and door openings.

Termites or "white ants" attack wood buildings in many localities. One way of protecting against them is by proper foundation construction and separation of the wood portion of the building from the foundation by sheet metal. Details

CABINS AND RANCH HOUSES

of termite protection, as well as protection against other insect pests, are given in a later chapter.

For greatest security, the walls of a cabin or other structure are bolted to the foundation. Heavy bolts, say $\frac{3}{4}$ in. in diameter, are placed at intervals of 6 ft. or so in the foundation. The head-end of each bolt is buried a foot in concrete, twice that depth in masonry walls. The threaded ends extend far enough above the foundation to pass through the sills, which are held down by a nut on each bolt. A washer is placed under each nut.

Whatever the foundation type, remember that, for some log cabins, two sides must be lower by approximately half the thickness of a log than the other two sides. Usually the supports along the longer sides are the lower, the longer logs being placed first. In cabins whose walls are made of logs placed vertically, the foundations can be the same height all around.

Chapter 4

LOG CABIN MATERIALS

WHEN building a log cabin, the first thing to do is to get the logs. This may not be as easy as it sounds in some localities, particularly in regions far removed from extensive forests. Local lumber dealers, telephone, telegraph and power companies, and owners of farms and wooded lots within reasonable hauling distance, are among the sources of logs when they must be purchased. If the cabin is to be built in the woods where standing timber is available, carefully inspect all available trees to determine whether their sales value is greater than their value as sources of cabin logs. For instance, you would not want to cut down a walnut tree just to get wood for cabin walls, because walnut lumber is worth a lot as a cabinet wood. If you are erecting a cabin in a national or state forest, it is necessary to get the approval of local forest authorities before you can cut trees for logs.

Among the logs suitable for cabin construction are cedar, tamarack, larch, pine, fir, balsam, spruce, aspen, and white oak. In fact, almost any kind of log can be used if it is cheap and plentiful enough; but for maximum length of service, the less durable ones (such as beech, aspen, maple, hemlock, cottonwood) should be treated with creosote or other wood preservative. This is especially true of logs placed in a horizontal position near the ground.

Because of the scarcity of more-durable log materials, aspen, once considered as an almost worthless tree, has come into considerable prominence as a source of log-cabin material, particularly in the Minnesota-Wisconsin-Michigan re-

gion. It is used for whole-log and split-log walls, partitions, and other cabin parts. Aspen log diameters range mostly from 5 in. to 1 ft. For maximum resistance to decay, the logs to be positioned near the ground should be given a creosote or other preservative treatment before they are placed, according to Lake States Aspen Report No. 15, issued by agricultural, wood-product, and forestry groups in the aspen territory. The report further suggests that careful construction and maintenance, with attention to ways of keeping the cabin material from remaining wet or damp for long periods, will make the aspen cabin satisfactory even though the wood is classed as of low durability.

Select logs that are straight and have only a slight taper from base to top. It would be ideal if logs with no taper at all were available in quantity, but this is unlikely. Logs with considerable taper can be used if no other kind is procurable. They will require somewhat more chinking. If you want to spend the time and effort required to build a hewn-log cabin, extreme tapering is not a serious matter because the log can be made uniform in thickness by cutting more wood from the base end.

Logs and poles from 4 to 12 in. in diameter are suitable for cabin construction. The larger ones usually are used in walls, while the smaller sizes go into roofs in the form of rafters, and in other parts where massiveness is not desirable or essential. Logs from 1 to 4 ft. longer than the walls in which they are to be used are necessary when corner construction calls for projecting ends. There are some types of construction requiring logs of the same length as the walls. Avoid excessively long walls that require logs too heavy to be handled conveniently. About 20 ft. is a desirable limit, and it seldom is necessary to make a cabin room larger than that. Although lap joints or other means can be used for fastening short lengths of logs together to produce long walls, this should be avoided because it weakens the walls.

LOG CABIN MATERIALS

The proper time to cut logs, and the subsequent treatment to be given them to prevent decay and insect damage, are determined by the way in which they are to be finished. The bark can be left on to preserve the rustic appearance; or it can be peeled off and the logs left bare or hewed to produce flat surfaces.

Logs that are to retain their bark should be cut in the fall, about the time of the first frost, according to forestry experts. During October and November is a satisfactory time in most localities. If logs are cut in late summer, the bark will remain on, but they are likely to become infested with destructive insects.

Difficulty sometimes arises as a result of the bark peeling off. One way of checking this is to score the logs. This is done by removing a narrow strip of bark from two opposite sides, for the entire length. Then pile the logs in the shade, in such manner that air will circulate freely through them, and let them season until the next spring or summer. When the logs are used for walls, the scored strips can be placed at top and bottom, where they will be concealed by the chinking. A few days after cutting, and again a short time before the logs are used, paint all ends, knots and scored areas with coal-tar creosote, to preserve the wood. When the bark develops a tendency to peel off, or when the logs are not scored, tack the bark in place with large-head roofing nails, spacing them about a foot apart each way.

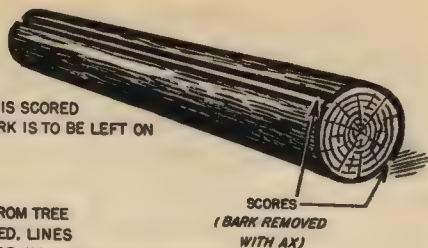
Trees whose trunks are to be used as peeled logs should be cut in the winter, when the sap is down. If cut in the spring, the wood will be attacked by organisms that cause decay and stain. Aside from the less rustic appearance, peeled logs are better than unpeeled ones. One reason is that they are less likely to be attacked by insects. Trees felled during certain seasons may become infested with beetles. The insects drill holes in the bark and lay their eggs in them. Such invasions are indicated by the presence of the holes and of

CABINS AND RANCH HOUSES

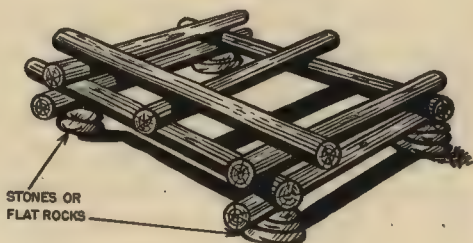


BARK IS WEIGHTED FLAT, TO DRY, AND IS USED FOR INTERIOR FINISHING ETC.

HOW LOG IS SCORED
WHEN BARK IS TO BE LEFT ON



REMOVING BARK FROM TREE
BEFORE IT IS FELLED. LINES
INDICATE CUTS MADE WITH AX



RIGHT WAY TO PILE LOGS FOR
SEASONING (AIR CAN CIRCULATE
AROUND EVERY LOG)



WRONG WAY TO SEASON LOGS
(NO AIR CIRCULATES AROUND LOGS)

Manner of removing bark from tree before it is felled, the scoring of logs, and the right way of piling them to dry are shown above. A draw knife is the best tool to use for removing bark that adheres tightly.

LOG CABIN MATERIALS

wood particles resembling sawdust, which fall out of the logs. The eggs hatch into larvae that feed on the inner bark, boring tunnels in every direction. This causes the outer bark to loosen and fall off. More than that, the grubs often bore into the heartwood and sapwood of the logs, badly damaging them before the wood is completely seasoned, usually a matter of a few months. Methods of combating such pests are discussed in another chapter.

Peeled or hewn logs are finished in a variety of ways. Sometimes they are left to weather naturally. It is, however, better to employ some preservative that will act to prevent decay and insect attack. Preservatives should be applied during construction, when all parts can be reached. Later applications, after the building has been completed, can be made with greater ease when the logs are peeled. Creosote is one of the best preservatives, but is limited because of its odor and color. Zinc chloride and similar water-soluble preservatives, applied by a pressure method or by steeping, are used. Paint usually is not employed because it clashes with the desired rustic appearance, although very pleasing color effects can be achieved by painting log ends, window sash and trim, and doors and door frames such colors as blue, tan, green, and red. A "log" paint that weathers to the color of long-exposed logs has been used. Various stains, while they may produce a pleasing appearance on peeled logs, are not considered as sufficient protection against rot, etc. Sometimes a preparation consisting of linseed oil with about one-fifth to one-third its volume of varnish is used on peeled-log walls and other areas. Unless a highly-effective preservative like creosote is used, the protective treatment should be renewed every few years. Often local inquiry or a letter to your state or government agricultural department will yield helpful information on log-cabin preserving and finishing.

When the logs are left exposed on interior wall surfaces, they absorb much light, causing the gloomy appearance that

CABINS AND RANCH HOUSES

is characteristic of most log cabins. This can be eliminated somewhat by applying varnish or shellac to the bark or peeled surfaces. The smooth coating reflects light better than the untreated surfaces. Do not stain peeled logs dark on interior walls. If a stain is used at all it should be extremely light in tone. Application of shellac or varnish alone will produce on most woods a color that is mellow enough to please everyone. Chinking materials should be light in color where they show on interior surfaces.

There are various ways of producing attractive "antique" or "weathered" finishes on interior cabin walls. Here is one: Apply a coat of flat white paint and, with coarse cloth or waste, immediately wipe over the surface so that much of the paint is removed from the "high" spots but considerable pigment remains in cracks, depressions, and other "low" places. Allow the paint to dry, and give it a coat or two of shellac. White shellac will not alter the color appreciably: orange shellac will impart a distinct tint and slightly darken the overall effect.

If your cabin has been in use for some time, and the bark starts to fall off because of improper earlier treatment, nail it back in place. It is not a bad idea to treat the back of the bark pieces and the surface of the wood with creosote or some other preservative before doing this.

Available logs and poles do not always permit the widest choice of materials. You may have to be satisfied with short logs or with logs so crooked that they have to be cut into short lengths before they can be used. Large diameters may be lacking. The taper may be excessive.

When such conditions exist, they often can be counteracted by proper design. Although it is easier to lay up a cabin wall with long logs and then cut out the windows and doors, it is possible to employ short lengths, using them about the door and window frames as the work progresses. By employing a design that calls for a great many windows,

LOG CABIN MATERIALS

short material can be utilized for intervening panels, making long logs necessary only for sills and for use above the openings. A log house should be low and rambling for best appearance, so that much material is not required above door height. Old-time cabins, and a great many of more recent construction, have windows that are too small and too few. This detracts from the outside appearance and makes the interior gloomy. Install all the windows you can without reducing wall strength too much or destroying large wall spaces necessary for beds, etc., and make them of a shape and size that will admit plenty of light and still harmonize with the general appearance. You will need fewer logs if you do, and the logs probably will be the major item of cost. Casement windows opening outward are better than other types for log cabins, in the opinion of many cabin builders.

In addition to walls with logs laid horizontally, a type of construction frequently employed makes use of logs running vertically, their lower ends resting on the sills and their upper ends supporting the roof plate. This type of construction can be employed when short lengths are to be worked in. Always place vertical logs and poles so knots in them point downward (so the logs are inverted), to retard entrance of water.

In addition to the materials for the walls and foundations, you will need some of the following, the exact requirements depending on the type of construction and the extent to which available poles, logs, and slabs are employed: 2- by 4-in. boards for miscellaneous uses; 2- by 6-in. to 2- by 12-in. timbers for joists and roof-ridge pieces; some 1-in. lumber ranging in width from 6 in. to 12 in., for roof sheathing and various other uses; some 2-in. lumber for false door jambs and window frames, the width depending on the thickness of logs; tongue-and-groove ceiling, for covering interior wall surfaces and making partitions; tongue-and-groove flooring of 4-in. size, or in random widths, for floors. Nails in as-

CABINS AND RANCH HOUSES

sorted sizes, including some large spikes of about 40-penny size; doors, window sashes, and door and window hardware; some kind of roof covering, ranging from split shingles to composition roofing; painted or non-rusting sheet metal for use under roof covering at ridges and valleys, and for flashing around chimneys or stove pipes. Doubtless there are other items for which a need will develop as the building progresses. You may find it difficult to estimate, beforehand, the exact quantity and kind of materials needed. This is true of most buildings, and particularly so of the cabin that is not being erected in strict accordance with a specific plan, but is being permitted to grow more or less naturally, like the trees from which it is made.

Chapter 5

LOG CABIN WALLS

LOG-CABIN walls are of two general types. In one the logs stand on end and in the other they lie horizontally. Cabins with vertical logs sometimes are called pole houses, probably because small logs or poles are more conveniently used in this manner than in a horizontal position. Among the advantages of the pole-house construction is the greater ease of erecting the walls, and the fact that short logs can be utilized. The forming of window and door openings is merely a matter of omitting logs. The biggest arguments against the pole house are its relative weakness and the fact that it is somewhat more difficult to chink than the conventional type.

Because cabin walls with logs placed vertically are pleasing in appearance and can be treated architecturally in a considerable variety of ways, and because of the other favorable points, the summer home, small ranch house, hunting lodge or lake bungalow might very well be a pole house. The objection that the construction is inherently weak can be overcome by careful spiking of the various elements as they are placed. As for the chinking, a little attention to fitting the logs will make most of that easy. In ranch-house construction, poles might be used as an outside veneer over conventional frame walls, for architectural effect.

After you have completed the foundation walls or piers, and made certain that they are level all the way around, the next job, and the first operation in wall-building, is to construct the sills. These are logs laid on the foundation to

CABINS AND RANCH HOUSES

form the bases for the walls. Sometimes true sills extend only beneath two opposite walls; sometimes all around—as in a pole house. With an adz, a broadax or an ordinary ax having a long cutting edge, hew each of the sill logs flat on the bottom to a width of about $2\frac{1}{2}$ in., so it will rest squarely on the foundation. If the walls are to be made of logs or poles placed vertically, hew the tops of the sill logs to produce a flat face wide enough to support the squarely-sawed ends of the vertical members. In hewing, the amount



An example of a cabin built with upright logs. In this case it would be better had the rear of the cabin been raised clear of the ground.

of wood necessary to be removed will depend on the straightness of the log, and the amount of taper. Use the soundest, straightest, and least tapering logs for sills.

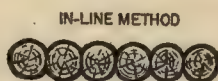
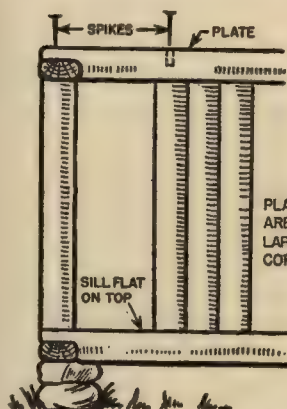
PALISADE WALLS OF VERTICAL LOGS

In constructing walls of vertical logs or poles, it may be desirable to hew each sill log on four sides to produce a square timber whose width is about the same as that of the vertical poles, or slightly greater. At the corners, where the sill pieces come together, make a lap joint by cutting wood

LOG CABIN WALLS

from each piece to a depth of half the thickness of the pieces, and for a distance from the end of each piece equal to the width of the other piece. Fasten the joint with heavy spikes, or by boring holes and inserting heavy wood or steel pins. Apply creosote or some other preservative to the wood surfaces at the joints, especially if a wood of low durability is used.

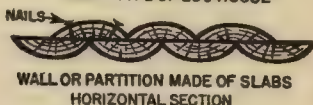
A plate is a log resting horizontally on the upper ends of the vertical logs of a wall. It is constructed exactly like the



IN-LINE METHOD



STAGGERED METHOD
WALL, HORIZONTAL SECTION
EXCELLENT FOR PARTITIONS
IN ANY TYPE OF LOG HOUSE



Here is the best manner of setting logs in an upright position in a cabin wall. Manner of making inside partitions is also shown.

sill. After the sill is finished, set a vertical log at each corner to form a post, fastening it to the sill with heavy spikes (something like 40-penny size) driven at an angle through the post and into the sill. This is called toe-nailing. Another way of fastening corner posts is to use wooden or steel pins extending upward through overlapping sill ends and into holes bored in the post ends. Temporary braces of 1- by 6-in. boards set at an angle of 45 degrees and nailed to sill and corner post can be used to give rigidity and safety while the rest of the wall is being built. Hoist the plate logs or timbers to the tops of the corner posts and spike them in

CABINS AND RANCH HOUSES

place. If suitable logs are not available, the plates and sills can be constructed of 2-in. planks nailed together until the desired thickness is produced. It is highly important that the plates and sills be level. See that they are, before you proceed with the placing of vertical pieces.

The poles or logs should be no less than 4 in. in diameter. It is desirable that their tapers be uniform, as this makes construction easier. For a good, weather-proof job, hew each log on opposite sides, and fit it carefully against the neighboring one. Vertical logs or poles should be placed preferably in an inverted position with respect to the way they grew, so water will drain out of the knots. Cut each pole so it will fit snugly between sill and plate, and fasten it in position by driving spikes diagonally into the sill (toenailing), and downward through the plate. The sill spikes can be driven so the next pole will cover them. Ends of the poles should be treated to prevent rotting.

When a point is reached where a door or window is to be made, hew the last pole so that the side next to the opening is plumb, as determined with a carpenter's level or with a plumb-bob and line. Allow sufficient space for the door or window frame, and begin the next series of poles. Continue this until the walls are finished. Remaining details of construction are practically the same as for the horizontal type of log cabin.

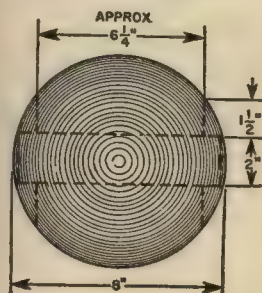
Split logs placed on end make excellent outside walls and interior partitions. Splitting, including edging of the resulting pieces, is a job for a sawmill. One way is to make a cut lengthwise through the middle of the log, then make two more lengthwise cuts to remove the thin edges of the two semi-circular sections. Another way, which is more economical of material, is to divide the log into three sections by making two cuts, and then edge the resulting sections. For example, an 8-in. log can be converted into a center section or timber measuring approximately 2 in. x 7 in., and two

LOG CABIN WALLS

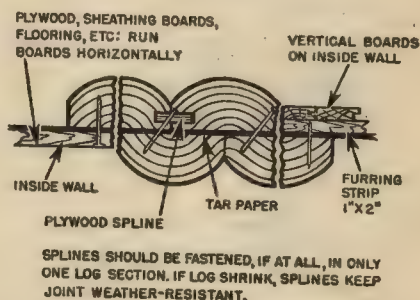
side sections, each with a curved surface, measuring about 3 in. x 6 in. and having edges about $1\frac{1}{2}$ in. wide.

A common way of assembling split-log sections into a wall is to place them in two rows with flat surfaces in contact, staggering the pieces so each overlaps one half of two facing pieces. For making an outside wall water-tight, heavy tar paper is placed between the rows; and this paper can be extended down to protect the sill. The split logs can be fastened by spiking: if nailed diagonally from the edges, nail heads will not show. Splines set in lengthwise grooves are

POSSIBLE WAY OF DIVIDING AN 8" LOG:



SPLIT-LOG WALL, SHOWING SOME FASTENING ARRANGEMENTS:



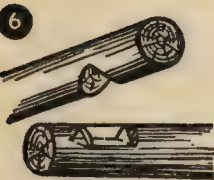
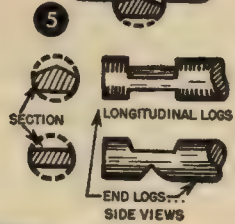
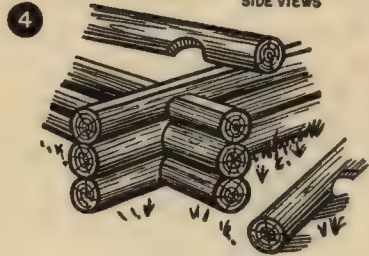
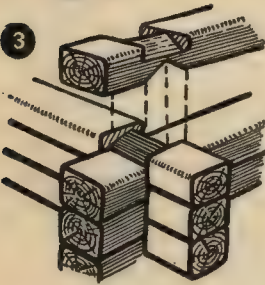
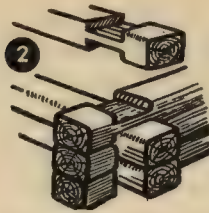
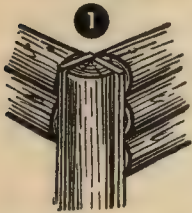
SPLINES SHOULD BE FASTENED, IF AT ALL, IN ONLY ONE LOG SECTION. IF LOG SHRINK, SPLINES KEEP JOINT WEATHER-RESISTANT.

Split-Log Construction.

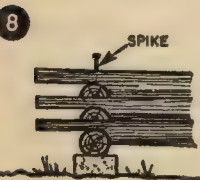
sometimes used at joints. They keep the weather out even if the logs shrink considerably. Strips of $\frac{3}{8}$ -in. or thicker plywood made with water-resistant adhesive can be used as splines. The split sections can be arranged in a single row, their flat surfaces against plywood paneling or tongue-and-grooved flooring or other boards placed horizontally. If this construction is used in an outside wall, greater insulating effect can be produced by using 1-in. furring strips to separate the interior surfacing material from the tar paper and logs: the furring strips can be run horizontally, and the interior boards vertically.

CABINS AND RANCH HOUSES

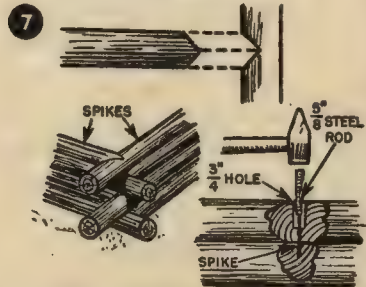
METHODS OF CUTTING AND NOTCHING LOGS FOR CORNERS



THE NOTCH IS PREFERRED BY VETERAN CABIN BUILDERS BECAUSE IT DOES NOT HOLD WATER



METHOD OF SPIKING PARALLEL LOGS



INTERSECTING LOGS ARE EVEN (NOT STAGGERED) WHEN THIS NOTCH IS USED, BUT IT IS WEAKER THAN INTERLOCKING TYPES

Here are a variety of corners from which to choose. No difficulty will be experienced in making any corner if these directions are followed.

LOG CABIN WALLS

WALLS OF HORIZONTAL LOGS

In forms of construction employing logs laid horizontally one above the other, there may be true sills and plates along but two walls, nearly always the longer ones. The bottom logs across the ends are somewhat above the level of the sill logs along the sides; and in the end walls, when a conventional gable roof is used, there are no distinct plates, the logs simply being made shorter to produce the roof slopes. Foundation walls or piers are generally made higher at the building ends to compensate for any difference in level of logs in ends and sides. Sill arrangement is determined by the type of corner wall joint employed. Some corner constructions in horizontal-log walls permit the builder to halve the ends of the bottom logs and make lap joints at corners, fastened with pins or spikes, to produce a uniformly-level sill all around, as in pole-house construction. Examples include walls where vertical corner logs are grooved and ends of logs are provided with tenons that project into the grooves.

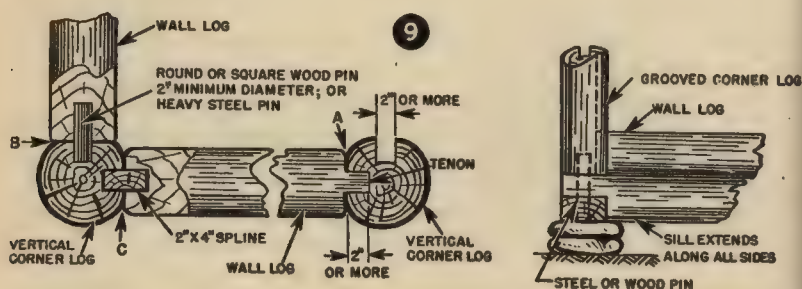
Set the sill logs carefully on the piers or foundation walls; and make sure they do not rock, by hewing the under side of each log at the points of contact with the foundation.

When a hip roof is used, it rests on plates extending along all four sides; when a simple gable roof is constructed, it rests mainly on plates running along the two longer sides.

Ways in which wall logs may be locked together at the corners are numerous, as indicated by the drawings on page 38. Of all the designs shown, No. 6 is considered by some to be among the best because it is simple and therefore can be cut easily with an ax, and because it does not catch and hold water. This matter of retaining water is important, for it may mean the difference between long and short cabin life. The No. 6 joint was a favorite with old-time cabin builders. It can be cut with the aid of a saw by the modern builder who is not particularly skilful with an ax.

CABINS AND RANCH HOUSES

The joint shown in No. 4 is not completely interlocking, but has the advantage of not retaining water. Spikes have to be driven into the joints, to make them absolutely rigid. In No. 7 is shown a method of using logs so that end and side courses are even, and not staggered as with most other types. No. 1 is a simple corner construction in which the logs are cut square and held together by vertical timbers spiked to their ends. A small log or quarter section of a larger one is used to fill the angle and produce a finished appearance.



Grooved-corner-log construction, showing various ways of installing horizontal wall logs. Joint A—This is the conventional way, the log end being cut to form a tenon that engages groove in corner post. Joint B—Not as strong as A, but might be used when log section is not long enough to permit integral tenons. If round pin is used, no thought need be given to alignment of end tenons or grooves. Joint C—Not as strong as A because of additional joint surface and grain position in spline.

This joint, as well as that in No. 7, lacks strength because it is difficult if not impossible to lock it securely with spikes. Therefore, it is necessary to fasten the logs together by driving spikes at intervals along their lengths. First a $\frac{3}{4}$ -in. hole is bored halfway through the top log, and a large spike inserted into it and driven through the remainder of the bored log and into the next one, with the aid of a $\frac{5}{8}$ -in steel bar and heavy hammer. Joint No. 8 is a simple one and reasonably strong if care is taken in spiking. In appearance

LOG CABIN WALLS

it is not quite comparable with some of the other joints that permit the full end of each log to show.

The extent of projection of the logs at the corners will be determined both by the type of notching and the personal taste of the builder. Usually the logs should be cut from 1 to 2 ft. longer than the walls, permitting a projection at each corner of 6 to 12 in. Measurements are made from outside surfaces of the intersecting walls. By letting the bottom logs project more than the top ones, and graduating those in between so that a uniform slope is produced in a line connecting the ends, an unusual effect is obtained, and an impression of great solidity is produced.

When plenty of logs are available, it is customary to cut window and door openings after the walls are laid. Logs are placed so that bad spots will be cut out, when possible. The top log of the opening is either cut away for the full width of the opening, or deeply notched at each extremity of the opening, so that a saw blade can be passed through. A 2- by 6-in. plank is nailed temporarily to the logs in such manner that the edge next to the proposed opening will act as a guide for the saw blade. Of course, this edge is made plumb, with level or plumb bob and line. A two-man cross-cut saw is used, one man working on the inside and the other outside. The logs are sawed out and the resulting short pieces set aside for later use in blocking up cracks or for other purposes.

Sawed ends of the logs are held by false jambs, which are 2-in. planks somewhat less in width than the average diameter of the logs. The jambs are placed against the log ends, and securely spiked to each log. It is not a bad idea to apply a preservative to the log ends, to counteract decay. Projecting sides of the logs are chopped off at an angle, as shown on page 43. Before cutting the opening, measure the width of the window sash or frame, or the door, or door frame,

depending on whether a frame is used in addition to that formed by the false jambs, and then add to it the combined thickness of the jambs.

Perhaps you are asking why short logs are not used in the first place, and fitted against the window and door jambs. The answer is that this sometimes is done, but that it is difficult and more laborious. The logs of a given panel must be cut to exactly uniform lengths, and must be placed so that their combined height is the same all the way around, or the wall will have an objectionable appearance. Whole logs must be used above and below the openings, for stability. When short sections are used for paneling between openings, it sometimes is desirable to nail them together at intervals, in addition to the end-nailing to false jambs.

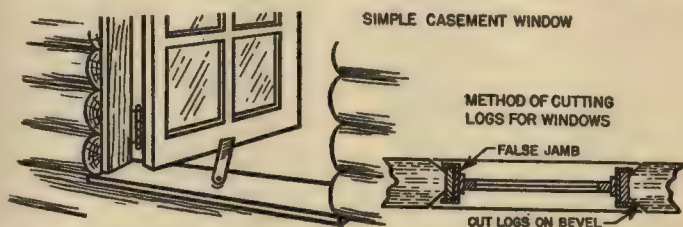
The simplest types of doors and windows are satisfactory for log cabins. Casement windows that swing inward or outward are considered best. It is not difficult to fit these. The sashes are hung from the frames with butt hinges, and are provided with a sliding bar that can be locked to hold them in any position when open. An ordinary desk-lid slide, with a wing nut working on a bolt running upward through the sill, can be used, or a regular window fitting obtained. The sash swings shut against stops that are strips of wood nailed to the frame, and is locked by a suitable catch. Doors are hung almost exactly like casement windows, except that they have no sliding arrangement to lock them in an open position. Screens should be provided over windows and doors to keep out insects. Door and window design and construction are discussed at length in a later chapter.

When laying cabin walls you can fit the logs closely together or leave cracks between them up to 2 in. or so wide. Some builders hew the logs flat on adjacent surfaces, so they fit together and require little caulking or chinking. Separation between logs is determined by the taper of the logs and by the depth of the corner notches. Also, it is by varying the

LOG CABIN WALLS

depth of the notches that the side walls are kept level. Perhaps the best plan, since you are building a real pioneer cabin, is to pay little attention to the width of cracks between the logs, just as long as they do not become too wide; and then fill in the space by one of the various methods of chinking.

Because logs change their positions in settling during the



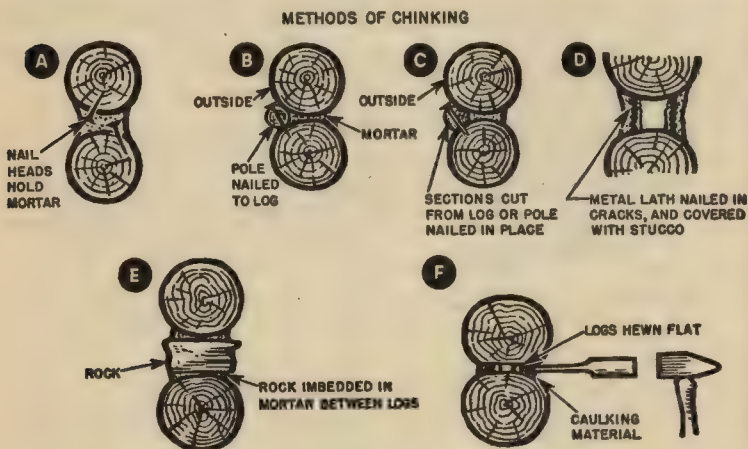
How to cut in a casement window that will swing out is shown in this illustration.

first year or so after the cabin is completed, the matter of chinking or caulking to close openings between them should be delayed as long as possible. However, if the cabin is to be used immediately, you can close up the openings at once, and plan to go over the chinking thoroughly a year later and repeat the process wherever necessary.

A number of methods of chinking and caulking are illustrated. When the openings are narrow, they may be closed by hammering some caulking material into them, as at F in the drawings. A serviceable caulking tool can be made by grinding the end of a 1-in. chisel square. Use this tool and a hammer or mallet to force the caulking material into the cracks. Sphagnum moss, cotton waste, oakum, dried ferns, and various other materials have been used successfully for caulking. Sometimes birds and mice make raids for the purpose of obtaining the moss or ferns for nest-building purposes, when they can reach it. Oakum is a loose fiber obtained from old hemp ropes, and is used extensively for

CABINS AND RANCH HOUSES

sealing seams in boats. Sphagnum moss is obtainable from florists who use it for packing plants. Commercial caulking compounds of various sorts can be used, those applied with a caulking gun being particularly convenient when there are many yards of joints to be filled. Cord-like plastic compounds can be pressed into place with the fingers or a blunt-



Various methods of chinking and caulking the logs in the cabin are shown. Any method will serve if it is carefully done.

ended tool. Caulking materials that remain flexible will maintain their seal under slight movement of the logs, and are easily repaired.

When openings between logs are much more than narrow cracks, some method of chinking involving mortar or an equivalent substance is employed. Good clay, properly applied, will last for a dozen years or so. Mix it with water until it is about the consistency of thin putty, and force it into the cracks with a small trowel. Stucco cement, lime mortar, cement mortar and wood-pulp plaster have been used for chinking cabins. Bagged stucco cement or wood-pulp plaster are merely mixed with water to the desired consistency. The cement is better for the outside. You can

LOG CABIN WALLS

make up your own stucco cement by mixing 1 part Portland cement, 3 parts coarse sand, 1 part slaked lime paste, and adding a small amount of hair for binding it together. The hair can be omitted. The mortar whose formula was given in the chapter on foundations can be used.

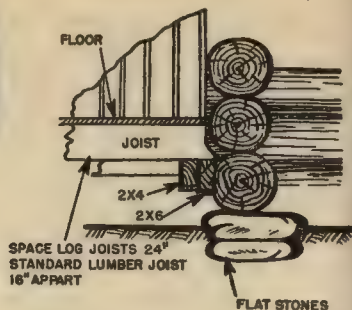
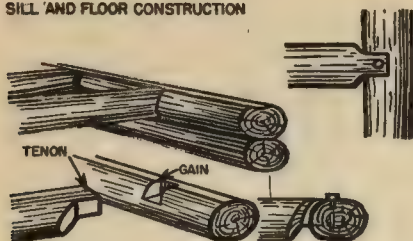
It is desirable to provide some anchorage for the mortar or whatever else is used. Large-headed nails, driven part-way into the logs as shown at drawing A in the series on chinking methods, serve well. Space them 8 to 12 in. apart. Lathing nails can be used. In B, the outside of the log wall is decorated with small poles nailed in the cracks. The poles serve the purpose also of compressing the mortar behind them and producing a tight joint. This construction might be a bit difficult to re-chink. In method C, a section split from a log is used instead of a round pole. This is a convenient way to use up damaged logs and sections cut from door and window openings. Expanded metal lath strips, nailed in the cracks as shown at D, make a durable support for plaster or mortar. An unusually attractive cabin wall is produced by laying the logs with considerable spacing between them and then filling the spaces with stone slabs imbedded in cement mortar. The stones usually are laid at an angle with the wall. Sandstone is excellent, or field stone broken to the desired size can be used. This construction is shown at E.

Caulking must be done both from the inside and outside. A light-colored material such as lime mortar is desirable for the interior because of its light-reflecting properties, when the log walls are to be left exposed. In addition to caulking or chinking between logs, you will have to plug all openings between the walls and chimney, around the roof, and wherever else insects and undesirable weather can enter.

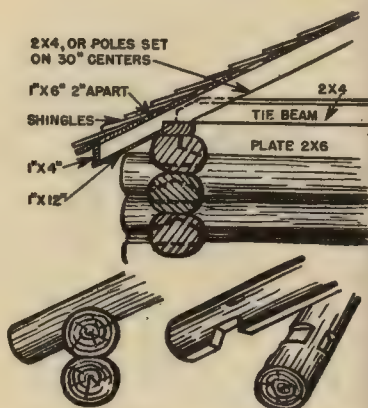
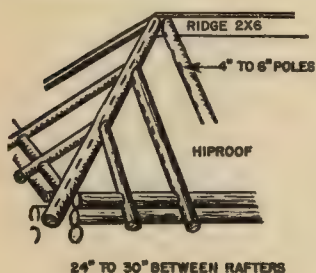
Much of the charm of a cabin of real logs, or any other kind in fact, comes from exercising good taste in such matters as proportioning, arrangement of windows, arrange-

CABINS AND RANCH HOUSES

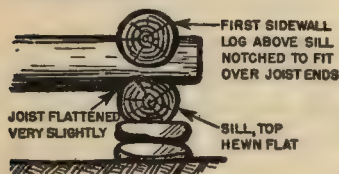
SILL AND FLOOR CONSTRUCTION



ROOF CONSTRUCTION

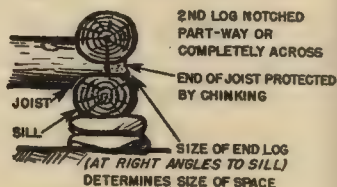


JOIST CONSTRUCTION



JOISTS PROJECT THROUGH WALL

METHOD OF CONCEALING JOIST ENDS



In the illustrations above, directions are given for building a cabin floor, framing a roof, and installing joists.

LOG CABIN WALLS

ment of the logs themselves, and the color imparted in one way or another.

A low, rambling log cabin is more charming than one that is high and severe in form. The eaves ought not to be much higher than the top of the door. Porches and ells and annexes can branch out at the most unexpected places and will add greatly to the appearance of the structure. Avoid short, stocky construction. When you build with logs or log substitutes stay away from structures more than a story high, unless you are expert at handling architectural details.

Windows can make or ruin a cabin, from the standpoint of appearance. To preserve the rambling effect, they should be relatively short and wide. The two-sash type of window used in ordinary houses is not always at home in the walls of a log cabin. A casement window is better. Do not be stingy with windows, but at the same time exercise some judgment in their use. Some cabin designs lend themselves to the use of abnormally large picture windows running part way or all the way to the floor. In the matter of windows perhaps more than anything else, the modern cabin builder should depart from the practices of his pioneer grandfathers. Builders of yesterday did not appreciate the value of adequate illumination indoors as much as it is appreciated today. It is entirely possible to install so many windows in the walls of a cabin room that, when they are open, the room becomes virtually a porch.

The arrangement of logs, as determined by log sizes, shapes and the type of corner construction used, is an important factor in the general appearance. It is good practice to use the largest available logs at the bottoms of walls, and gradually decrease their size as the tops are approached.

A variation from usual appearance is produced by combining pole construction with horizontal log arrangement. The panels between windows and doors are formed by logs set vertically, while spaces above and below windows

CABINS AND RANCH HOUSES

and above doors are filled in with horizontal pieces spiked in place. The effect, when the job is properly done, is pleasing.

From the standpoint of exterior finish, the log-cabin builder has little cause for worry. Perhaps the matter of finishing should be postponed until roofs and floors and porches have been discussed; but finishing operations apply mainly to walls, so they can be considered here.

Logs with the bark left on need no attention other than that which might be necessary from the standpoint of insect-proofing. Peeled or hewn logs can be left to weather naturally, although the application of a stain or preservative that will darken the wood and at the same time provide protection against decay and insect attack, may be desirable in many cases. Of three principal finishing materials, namely paint, stain and creosote, stain often is used because it is easy to apply, produces less objectionable odor than creosote, and gives a more rustic appearance than paint. Stains containing creosote are useful. Apply preservative to the logs before they are laid in the walls, so that notches and other areas that later will be concealed can be reached. Stain can be applied to the completed walls with a brush or a spray gun of some sort. A simple preservative for peeled logs consists of 2 parts linseed oil and 1 part turpentine. It darkens the wood somewhat, and causes it to take on a mellow, richer brown color with age.

Chapter 6

LOG CABIN FLOORS AND ROOFS

IF YOU do not want a cabin floor that resembles a hammock, or a roof that might be a sieve in disguise, avoid hasty and careless construction when you come to these important parts. Much that is said concerning floors and roofs for log cabins can be applied to other types of cabins, and to lodges, cottages, tourist homes, and similar structures.

The typical cabin floor consists of tongue-and-groove flooring laid on joists made either of logs or dimensioned lumber 2 in. thick. The installation of log joists is properly a part of sill building, and should be completed before the wall proper is erected. Suggestions for log joists often call for spacing on 2-ft. centers. When this spacing is used, the following sizes are specified for various spans: 12-ft. span, use a log 6 in. in diameter; 16-ft. span, 8-in. log; 20 ft. span, 9- to 10-in. Avoid longer spans if possible, because of the danger of sagging. There will be some natural settling or sagging of the log for any span. Some cabin builders compensate for this by hewing the log on top so that the floor is about 2 in. higher in the center, sloping gradually to the edges at the ends of the joists. Center piers and a beam running the length of the cabin (at right angles to joists) will add rigidity. Log joists can be spaced closer than 2 ft., say on 18-in. centers. Joists made of 2-in. timbers are spaced on 16-in. centers, as in conventional house construction.

Strong construction demands that the joist ends be tied into the sills by proper joints. One of the simplest and strongest methods, and one that was used widely by pioneer

CABINS AND RANCH HOUSES

builders, is to lay the joist ends on the sills and let them project a few inches beyond the outer wall surface, or until they are even with it. The sill is, of course, hewed flat on top. The bottom part of the joist, where it rests on the sill top, should be hewed just enough to prevent rocking. No more wood than absolutely necessary should be cut away, or there may be danger of splitting. A floor, you know, may be called upon to support a great weight. When log joists are used, the weight of the logs themselves amounts to no small figure. Fasten the joist end to the sill by boring a 1-in. hole through the two parts and driving into it a steel or wood pin; or a 40- or 60-penny spike can be used, the hole being then bored half way through the joist end, and the spike driven the rest of the way with the aid of a steel bar used like a punch.

After all the joists have been fastened to the sills in the manner described, the cabin structure will resemble a grating with the two sills, extending along the longer sides of the cabin, serving as a framework for the cross-bars or joists. The first logs across the cabin ends can be laid either before or after the joists are in place. Usually it is preferable to set the joists first, so that the end logs will not be in the way, if continuous sills are not used.

The diameters of these end logs, together with the type and degree of notching, will determine the space between each sill log and the next side-wall log above it. Usually this space can be made so wide that only a small amount of notching will be necessary along the under side of the second log, at the points where the ends of the sills occur. Chinking, possibly with the use of stones in addition to clay or mortar, will take care of the intervening space. It is not important for the top surface of the joists to be even with the tops of the sills. The joist tops are, however, hewed slightly flat, and all irregularities removed so that the floor boards will lie flat.

If the projecting of joist ends through the cabin walls is

LOG CABIN FLOORS AND ROOFS

not desirable, the construction can be varied enough to overcome this. The method can be as described, with the difference that the joists are cut to such length that their ends will come about midway across the sills. Then the log directly above them is notched only halfway across its diameter—just enough to clear the joists. Subsequent chinking will conceal the ends of joists completely, and protect them from the weather. The notching of the top logs can be done with a 2-in. chisel and mallet or hammer.

A third method of attaching joist logs to sills makes use of a relatively difficult joint in which the ends of the joists are mortised into the sills, as shown in the drawings on page 46. Each joist end is cut to form a tenon, and a corresponding notch is made in the sill with a wide chisel. A hole is bored through the end of the tenon and into the sill, to receive a pin. The chief objection to this form of joint, according to veteran cabin builders, is that the forming of the tenon, which reduces the diameter of the log at that point, makes the log weaker and likely to split at the base of the tenon if the load becomes too heavy. Tops of joists are even with the sill tops, in this construction.

The scarcity of logs in some localities, and the fact that sawed lumber frequently can be obtained cheaper than logs, may make it advisable not to use log joists. Timber joists 2 in. thick and spaced 16 in. apart should, according to log-cabin experts, be 2 in. wider than the diameters specified for the logs. It is not necessary to do any notching or make fancy joints to fasten sawed joists to the log sills. Flatten each sill on the inner side as well as on top. Then spike a 2- by 6-in. board to it, extending it for the full length of the wall. The upper edge of this board should be approximately even with the top surface of the sill, although it makes no difference if it is not. Next spike a 2- by 4-in. board to the 2- by 6-in. plank, with the upper edges of the two pieces even. The ends of the joists which are cut to fit snugly be-

CABINS AND RANCH HOUSES

tween the sides of the logs directly above the sills, rest on the ledge formed by the 2 by 4 and the 2 by 6. Toe-nail the joists to the other planks, and if possible to the logs. Further rigidity is produced by bridging the joists every 8 or 10 ft. of their length. This consists of cutting 1- by 4-in. strips of wood to such length that they will extend from the top edge of one joist to the bottom edge of the next one, the ends resting against the joist sides, where they are held by nails. Two such braces are employed at each point, forming an X. This row of X's extends for the full length of the floor.

Another way of setting dimensioned joists, and a more solid way than that just described, is to notch the sill logs to receive the joist ends, just as if tenoned logs were used. Do not cut tenons on the joists, but let them remain their full diameters and cut away the log above, if necessary. The notches should extend about one-third or half the distance across the sills. When this construction is employed, the load of the floor bears directly on the sills, instead of being transferred from the joist to the sills through spikes. For this reason, the second method is better than the first even though it does involve additional work. If a boring machine is available, the recesses for the 2-in. timbers can be made quickly with the aid of an auger bit of sufficient width. The so-called 2-in. boards procurable at lumber yards are more nearly $1\frac{3}{4}$ in. thick, for the dimensions are figured when the lumber is sawed and before it is planed.

After the joists are in place, the walls up and the roof completed, the floor can be laid. You can use standard 1- by 4-in. or random-width 1-in. flooring, tongued and grooved so that the edges fit together snugly. Pine, oak, maple, or similar wood is suitable. The boards are fastened to the joists by driving nails at an angle through the tongued edges. The next board covers the nail head. When log joists are used, an 8-penny flooring brad should be employed. With sawed timber joists, the 6-penny flooring brad is large

LOG CABIN FLOORS AND ROOFS

enough, for there is no sapwood that must be penetrated before the more durable heartwood is reached. For the most durable floor, a subfloor of $\frac{5}{8}$ -in. Douglas fir plywood or 1-in. sheathing boards laid diagonally is placed directly on the joists, and the finish flooring is nailed to the subfloor with 6-penny nails. The floor can be finished with spar varnish, either with or without staining; or it can be given two or three coats of thinned shellac (3-lb. cut), and waxed.

THE ROOF

The type of roof used on a log cabin is largely a matter of personal choice. It should, however, harmonize with the rustic surroundings. Wood shingles are satisfactory, and will last 15 to 50 years, depending on the wood and climate. They probably are more hazardous, from the fire standpoint, than some other types. Slabs, strips sawed or split from logs so that they are flat on one side and curved outward on the other, can be used, but generally do not give a leak-proof roof. Composition roofing, composition shingles, asbestos shingles, and the like can be used, if they are of a conservative color such as brown. Asbestos shingles that simulate weathered wooden ones, even to ridges imitating the raised grain, are available.

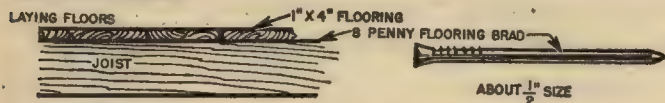
But whatever the type of covering, the framework for the roof will not vary much from established designs. The plate is the top part of the wall on which the roof rafters rest. This can be a sawed timber or a log. When a straight gabled roof is used—one that looks, in cross section, like the letter V inverted—there may be only two plates, one on each side. When a hip roof—one that resembles a gabled roof with the ends sliced off on an angle—is used, the plates extend along all four walls.

The plates support the rafters, which are notched to fit over them. The tie beam is a pole or 2- by 4-in. plank that

CABINS AND RANCH HOUSES

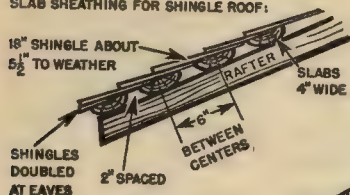
ties the ends of the plates together, when but two plates are used. The upper ends of the rafters come together at the ridge piece, a 2- by 6-in. board running the full length of the roof. Rafters are spaced from 16 to 20 in. apart, a closer

FLOOR CONSTRUCTION



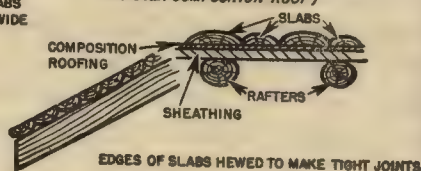
ROOF CONSTRUCTION

SLAB SHEATHING FOR SHINGLE ROOF:



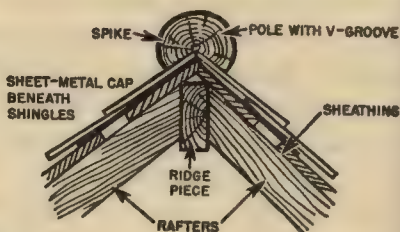
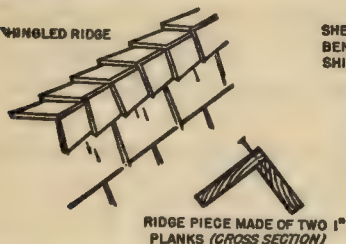
FOR COMPOSITION ROOF

(FOR RUSTIC APPEARANCE SLABS CAN BE LAID OVER COMPOSITION ROOF)



RIDGE CONSTRUCTION

SHINGLED RIDGE



Typical floor and roof details suitable for the rustic cabin. A shingled ridge should be laid so shingles point away from the prevailing winds.

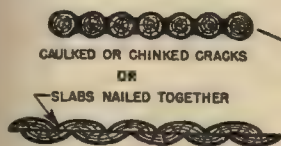
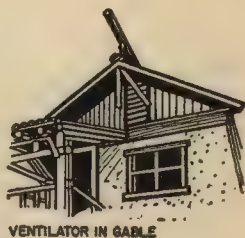
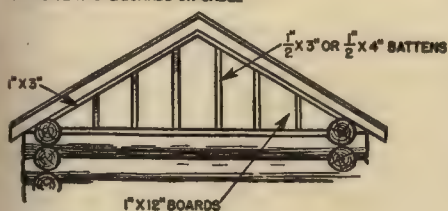
spacing being used when the roof is likely to have a heavy load of snow to support. The pitch or steepness of the roof is determined by the relative dimensions of the span or horizontal distance across the roof measured above the

LOG CABIN FLOORS AND ROOFS

plates, and the height or distance from the plane of the plates to the ridge piece.

Generally the roof should be one-fourth to one-half pitch. A steeper pitch can be used in regions of heavy snowfall. A roof having a one-fourth pitch has a rise of 6 in. every foot, the height being one fourth the span. When the pitch is one half, the rise is 12 in. every foot, and the span is twice the height.

USING VERTICAL BOARDS ON GABLE



SHINGLED GABLES



18" CEDAR OR REDWOOD SHINGLES
OR SHAKES, LAID $5\frac{1}{2}$ " TO WEATHER

Several ways of finishing a gable so that it adds to the attractiveness of the cabin. Shown are board-and-batten, vertical pole or slab, and shingle.

Cutting rafters demands care, if they are to fit properly. They can be made of either 4- or 6-in. poles or 2- by 4-in. boards. A satisfactory way of notching pole rafters and the plate at the point of intersection is illustrated. (See page 46.) When the plate and rafters are 2- by 4-in. timbers,

CABINS AND RANCH HOUSES

only the rafter is notched, for a maximum depth of half its diameter. Spikes hold the pieces together.

Wide eaves are desirable in log cabins because they keep the log walls dry and add to the rambling appearance of the building. Therefore the rafters generally should project beyond the log walls for a distance of at least a foot. Wide eaves also keep summer sun off the walls and windows, and are particularly desirable on the south side of a cabin not shaded by trees.

Upper ends of the rafters are cut on an angle that will permit them to fit solidly against the ridge piece. Whether pole or dimensioned rafters are used, this ridge piece should be of sawed lumber. Rafters are fastened to the ridge piece with nails.

In erecting a roof, cut the ridge piece the same length as the plates, and cut the end rafters (four in number for a straight gable roof) to the proper dimensions. The angles at which the upper and lower ends of the rafters are cut is determined by the pitch desired. A steel square is employed for determining the angle as pictured on page 82. Erect the end rafters and fasten them to the ridge piece and plates, which previously should be marked to indicate the positions of other rafters. Then fasten in place the remaining rafters. The roof now is ready for sheathing.

If you have a quantity of slabs cut from logs or can obtain them cheaply at a sawmill, you can use them for sheathing. For a shingle roof there should be spaces between slabs. If the slabs are 4 in. in diameter, they can be spaced 2 in. apart. Lay the slabs with the flat side up (bark side down). If composition roofing requiring a uniform foundation is used, the slabs should fit tightly together at the edges, and some wood should be cut from the edges to eliminate thin parts. Extend the sheathing beyond the gable ends for the required distance. If desired, you can nail the projecting ends of the sheathing to false rafters or boards.

LOG CABIN FLOORS AND ROOFS

When laying a shingle roof, start with a double course of shingles at the eaves, and then work towards the ridge, all remaining courses being single. Most of each shingle is covered by the ones above it. Satisfactory amounts to expose to the weather are: for shingles 16 in. long, 5 in.; 18-in. shingles, 5½ in., and 24-in. sizes, 10 in. Space shingles ⅛ in., if they are not wet thoroughly just before laying, or dipped in creosote stain. Use copper or zinc-coated nails.

Before laying any kind of roof, cover the ridge and any valleys with painted or non-rusting sheet metal, to reduce possibility of leaking. This metal should extend 12 in. each way from the joint. The roof covering is laid over it. The ridge of the roof is finished off with a ridge cap of some sort. An excellent cap for a log cabin is made by cutting a V groove along a pole 4 in. or so in diameter. Another way of making a cap is to nail two pieces of 1-in. lumber together to form a trough measuring about 6 in. on a side. Still another way of finishing off the ridge is to lay shingles as indicated in one of the sketches, pointing them away from prevailing winds.

There are numerous variations that can be introduced for creating an interesting roof of composition material laid in rolls. One way is to run the strips parallel to the roof ends, that is, from eaves to ridge; and then nail battens over the seams, after the usual tarred joints have been made. The battens are made by splitting 3-in. poles in halves, or can be sawed strips or sawmill slabs. Other attractive systems can be worked out. As another example, a composition roof can be covered completely with parallel slabs, to give the appearance of the old-fashioned slab roof that, unfortunately, nearly always leaked.

There are a variety of ways to finish the gable ends of log cabins. One is to run the logs all the way to the roof top, cutting the ends to the proper bevel. Another method that produces a weather-tight and good-looking job is to

CABINS AND RANCH HOUSES

set 1- by 12-in. boards on end, fastening their lower ends to the tie beam and their upper ends to the end rafters, and then sealing the cracks between edges with battens made of $\frac{1}{2}$ - or $\frac{3}{4}$ -in. wood strips about 4 in. wide. Slabs can be used for battens.

The gables can be made of logs or poles set on end and made weather-tight by chinking. A similar effect is produced by slabs in vertical position, nailed either to flat boards or to other slabs set with their flat sides outward and staggered so that joints are covered. Incidentally, this method can be employed for inside partitions.

Shingled gables blend with log construction. Small-sized shingles, such as the 16-in. size with $4\frac{1}{2}$ or 5 in. of wood exposed to the weather, are preferable because the narrow horizontal rows are in harmony with the squatty appearance of the cabin.

A useful feature is a wood ventilator consisting of a series of wood strips set at an angle with lower edges on the outside, installed in the gable. This keeps out rain but admits air. It should be screened on the inside to exclude insects, and provided with a hinged cover so that it can be closed in cold weather.

There are, of course, variations to the method of framing a roof. One way that was employed generations ago, and still is to be found in vacation cabins, is to build the gable ends up to the desired height and shape, and then lay logs or poles parallel to each other and to the eaves. The projecting ends of these poles produce a decorative effect at the gables. Butts and tops are alternated, so that an even construction results. If the poles are laid close together, shingles can be applied directly to them. If composition roofing is used, sheathing must be added. Sometimes these parallel poles or "ribs," often called purlins, are spaced 2 ft. or so apart, and are covered with sheathing running from eaves to ridge. Any type of roof covering can be

LOG CABIN FLOORS AND ROOFS

applied. Wooden shingles or shakes are laid directly on the ribs, no sheeting being used.

A log cabin generally is constructed with ceiling joists or beams. These are logs or dimensioned pieces extending across the cabin, the ends being fastened to the side plates. When the interior is to be finished with ceiling, it makes little difference which kind of ceiling joists are used, because they will be hidden from view. Two-by-fours, their ends spiked to the roof rafters, are commonly employed. When the interior is not to be ceiled, rustic beams extending across the room add much to the appearance. These beams can be massive, and can support vertical logs that extend up to the roof ridge, and which are made rigid with rustic braces set at angles of about 45 degrees to the beams and uprights. Spacing of beams is determined largely by their sizes. Ceiling joists made of 2- by 4-in. lumber generally are on 16-in. centers.

Chapter 7

LOG CABIN PORCHES AND INTERIORS

A LOG cabin is not complete until it has at least one good-sized porch. Indeed, this is true of any type of vacation structure that is used mostly in summer. While the interior is mainly given over to cooking, sleeping, and congregating about the living-room fireplace on chilly evenings or winter days, the porch will become the most used part of the cabin. In fair weather a hammock, easy chairs, a convenient table, plenty of air and the eternal music of the outdoors lure you and your friends to the porch. For maximum benefit the porch should be screened and protected by curtains against storms. Then it can be used for dining and sleeping purposes, becoming in effect an extra room. And a porch is much cheaper to build than a walled room, no matter whether the cabin is built of logs or shingles.

There are many ways of incorporating a porch into the cabin structure. For instance, if it is desired to have a porch at one of the gable ends of the house, the framework for the porch roof can be made by extending the roof plates and ridge board the required distance, and erecting rafters that continue the roof structure beyond the cabin wall. The inverted V-shaped space beneath the roof generally is left open. If the roof does not project very far, it can be self-supporting, no porch posts being required. An interesting and attractive way of making such a roof is to use longer logs for the upper courses of the sidewalls, and then install several fairly large logs as ribs in the roof. These ribs run parallel to the plates and ridge piece. The third sidewall log

LOG CABIN PORCHES AND INTERIORS



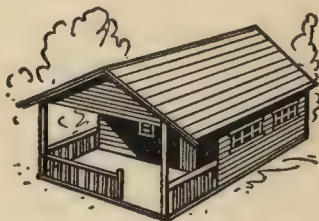
ROOF CONTINUED AT GABLE, NARROW PORCH



PORCH ROOF TIED INTO MAIN ROOF



ROOF CONTINUED AT EAVES



ROOF CONTINUED AT GABLE, WIDE PORCH



HIP-ROOFED PORCH



PORCH ROOF JOINED TO SIDEWALL

Some common ways of building porches. Often the porch framework is an integral part of the cabin structure.

from the top projects, say, a third of the porch roof extension; the second log from the top, two-thirds of the extension, and the top log all the way across the roof space and for several inches beyond the line where the roof edge will be. The log ribs and ridge piece extend the same degree as the top side-wall log.

When the roof extension over the porch is to be consider-

able, it is advisable to use corner posts and to close in the gable end of the porch roof, by one of the various methods available; or else make a hip roof. The space above the porch floor generally is not ceiled, because there is no particular advantage in closing it.

When the porch is at the side, so that its roof is virtually or actually a continuation of the eaves, the roof construction will depend somewhat on the height of the cabin proper, and the size and design of the porch. The roof rafters of the cabin can be extended beyond the eaves far enough to provide rafters for the porch roof, if the roof pitch is not great and if the porch roof does not extend out too far. When such a construction would bring the outer edge of the porch roof too near the floor or ground, the roof can be given a smaller pitch, and its rafters tied into the main structure either along the wall below the cabin eaves or in the roof at a point somewhere above the eaves. The latter construction is better when a considerable pitch must be given to the porch roof to provide good drainage. In this case, the porch roof rafters are spiked to those of the main roof. When the cabin is in a region where snowfall is heavy, it is better to use a gable roof, no matter where the porch is situated. A gable roof extending from the side of the main roof is tied into it by extending a ridge board and plates outward from the main roof, and erecting rafters in the usual manner.

A rustic construction is almost imperative, if the porch is not to look like something that belongs to another building. Use logs 5 in. or more in diameter for the porch posts, and smaller poles for the porch railing if one is used. Likewise, poles can be employed to build railings along the steps. When it is desired to screen the porch, and open railings are not desirable because screen wire, extended to the floor, is easily damaged by shoes and chair rockers, the porch can be closed in by building a boxing of two rows of slabs staggered and nailed with flat sides in contact, or by setting

LOG CABIN PORCHES AND INTERIORS

small poles vertically and close enough together to keep out insects. Building an insect-proof wall of poles is not easy, when a single row is used. A suggested method is to employ two rows of slabs and place a layer of tarred building paper between them. Poles or slabs can be used for closing unsightly spaces beneath porches.

Because a screened-in porch amounts almost to a necessary luxury, set the corner posts and intervening supports in such positions that the spaces between them will take standard-width screen wire tacked to wood frames. Among the standard screen-wire widths are 24, 26, 28, 30, 32, 36, 42 and 48 in. Thus, for 36-in. screen wire, allowing an inch along each edge for frames, the space between two posts should be 38, 75, 112 in., etc. These figures allow for an inch between adjacent screen-wire strips, when more than one is used, in addition to the allowance at both sides.

To keep out unwanted wind, sun, and rain, awnings or curtains of some sort are desirable. These can be strips of awning material placed either inside or out. It is easier to make them wind- and water-tight if they are outside. In that position they also provide protection for the screen wire in winter. A satisfactory curtain for most purposes consists of a rectangular piece of awning cloth or canvas with hems at least an inch wide across the top and bottom. Pass a wooden strip through the upper hem, and use it as an enclosed batten for nailing the curtain to the porch frame. Through the lower hem insert a round wood bar or metal pipe or rod, to act as a weight and roller. This bar can be tied down at the ends, when it is desired to close the area completely. At other times it can be rolled part-way up and held in position by tie strings or strips of cloth sewed at intervals along the curtain edges. When the lower bar is rolled part way up and held outward from the porch by two supports, the curtain becomes an effective awning.

Whatever the type of porch, make it as wide as possible,

CABINS AND RANCH HOUSES

so that there will be room to swing hammocks, serve meals, and move about. So that water will drain off, the porch floor must be sloped slightly. A drop of about 1 in. every 5 or 6 ft., measured from the wall outward, is sufficient. This slope is obtained by running the floor joists parallel to the wall and setting each one slightly lower than the next one towards the wall. Thus for a floor 10 to 12 ft. wide, the out-



A type of porch that is supported by small poles. When screened in, this provides a large room with the use of little material.

side joist would be 2 in. lower than that next to the house wall.

Run the floor boards across these joists, that is, from the wall outward. If the rainfall is extremely heavy, so that the porch will be wet much of the time, use plain-edged boards, and leave spaces about $\frac{1}{8}$ in. wide between them. This prevents water from remaining in the cracks for long periods and rotting the wood. Usually tongue-and-groove flooring, preferably of cypress or redwood for resistance to weather, can be used. When laying the floor, coat the edges of the boards thoroughly with white lead thinned with linseed oil, to produce water-tight joints.

Finish the floor by painting it, or by applying varnish or

LOG CABIN PORCHES AND INTERIORS

linseed oil. Paint is probably preferable, but it should be of a color that will harmonize with the remainder of the cabin. In the winter, porch floors catch much of the mud and snow that otherwise would be tracked into the house.

A useful and attractive type of porch consists of a stone-paved terrace overhung by a roof, or else left without overhead protection. Such a terrace can be tucked in at intersecting corners of certain types of log houses. The paving can be of field stones, set in the ground or bonded with mortar.

LOG-CABIN INTERIORS

The interior of a log house is likely to present something of a problem. How to finish it? What built-in features to include? How to make the stairs, if any? The fireplace?

Because a log house must go through a settling and drying-out period after it is erected, the applying of finishing material to interior walls should be deferred a year or so, or as long as possible. Chinking done immediately usually has to be repaired the following year. The simplest way of treating interior walls of log cabins is to leave them as they are, with the chinking showing. Bark-covered logs appeal to some persons, while others prefer their logs smooth. If you do not mind the extra labor, you can hew the inner surfaces of the logs flat, to produce even walls. This is done as the logs are put into place.

The particular interior finish you select will depend somewhat upon the uses to which the building is to be put and the tastes of the occupants. If convenience rather than picturesqueness is desired, some sort of smooth wall construction should be employed. Some log cabins are plastered, the plaster being applied to wood or expanded metal lath nailed over the logs. Easier methods are available to the craftsman who is not adept at plastering, or who does not associate

CABINS AND RANCH HOUSES

plastered walls with rustic cabins. Ordinary tongue-and-groove ceiling boards running vertically can be employed, although there is little to commend this type of covering from the standpoint of beauty. Ordinary $\frac{3}{8}$ -in. flooring can be used.

A much more pleasing finish is produced with knotty pine, cypress, redwood, or some kind of plywood material. These materials can be treated in an almost endless variety of ways to make them attractive. They can be worked into all kinds of panels and other forms. Natural wood surfaces such as these finishing materials produce are much more desirable than the various composition boards. Another useful material is log-cabin siding of pine, redwood, pecky cedar or cypress, etc. This can be employed in an amazing number of ways to make the cabin interior really charming. Its use is considered more extensively in another chapter.

A knotty-pine finish is easy to produce by anyone capable of handling lumber. At any lumber mill you can purchase pine boards that are full of attractive knots. Select those having round or oval knots, when possible. These boards, simply placed vertically and fastened to the logs with finishing nails whose heads are countersunk, are attractive. Or you can bevel the edges for about $\frac{1}{4}$ in. each way from the corner, and produce a paneled effect. Boards may be of uniform width, say 10 or 12 in., or of random widths. They can be worked into panels and other pleasing variations. When purchasing boards for interior finishing, specify that they be sanded on one side.

In a similar way, cypress, redwood or other appropriate lumber can be employed. There is available a veneered plywood material that blends excellently with the log-cabin atmosphere. One surface is covered with a veneer of knotty pine. This plywood can be obtained with the hard parts of the pine grain treated so that they appear as if darkened by natural aging. The purchaser can then use an acid or oil

stain or lacquer to color the soft parts of the wood surface any tone desired. He has his choice of several base colors, and of course there is a wide variety of top colors to choose from. By proper blending of colors, any antique or aged effect desired can be reproduced perfectly. Furthermore, finishing costs are lowered because only a coat of the stain and an application of varnish, white shellac, or other protective material is required, instead of the four or more coats usually specified for ordinary wood. Plywood panels generally are obtainable in the widely-used 4- by 8-ft. size, in other sizes ranging from 2½ ft. wide to 12 ft. long, and in thicknesses from ⅜ in. to ¾ in. (to 1⅛ in. for exterior-type). For further details, see the chapter on plywood (page 125).

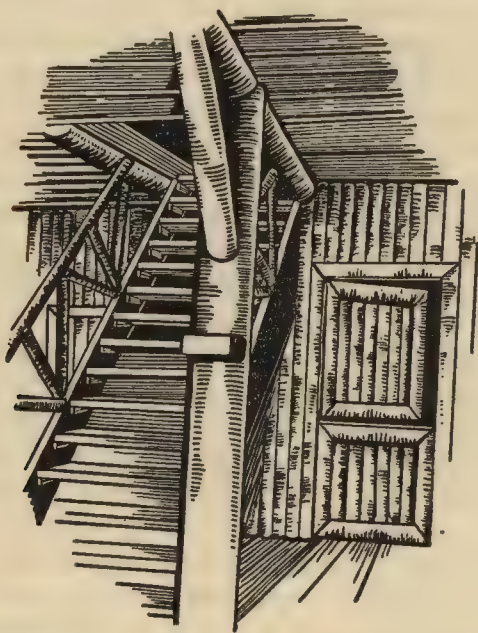
California redwood lends itself to interior use because of its natural color, a pleasing reddish hue, and its physical properties. It is close-textured and contains no resin, so that paints applied to it adhere evenly and penetrate readily, with little likelihood of peeling. Although when left in its natural color, redwood is pleasing, it can be stained with any of the standard preparations.

A finish that blends well with log construction, and which can be used for anything from wall surfaces to cabin furniture, is produced by scorching cypress, redwood, or other lumber with a blowtorch and removing the charred wood with a wire brush. This treatment darkens the hard portions of the grain until they range from a rich brown to a black, and darkens the softer portions to a less extent, at the same time giving them an attractive brown color. The burning and brushing can be regulated so that a considerable variety of tones, all in warm brown, can be produced. The grain of the wood becomes three-dimensional, the hard, less charred parts standing out in low relief. This treatment is known as the Sugi process, and is said to have originated in the Orient. It can be used also on pine, cedar, and any other

CABINS AND RANCH HOUSES

wood that has a grain prominent and differentiated enough to produce the desired finish. It generally is best to apply one or two sealing coats of thin, white shellac followed by two coats of floor wax to Sugi wood, to bring out the colors better and to provide a more durable and easily cleaned finish.

These various types of interior finish stray somewhat from the main idea of using materials available in the forest whenever possible. By using, in addition, poles and logs,



Rustic pillars and braces and an interesting door arrangement make the interior of this cabin attractive.

either peeled or with the bark left on, interesting effects can be obtained. When it is necessary to erect posts and columns for supporting balconies or roofs, these can be of seasoned logs made rigid by knee braces, which are smaller logs set at an angle to the post and extending outward to the

LOG CABIN PORCHES AND INTERIORS

surface being supported. The braces can be fastened by mitering and spiking, and perhaps set into shallow recesses cut for them.

Partitions may be built in a variety of ways. Slab or pole construction, as already described for porches and gables, can be employed. Another cheap method is to use wide boards such as 1- by 12-in. knotty pine set vertically, with the cracks between them covered by 2-in. strips or battens from $\frac{1}{2}$ to 1 in. thick, applied to both sides. Still another way of building partitions is to erect 2- by 4-in. studs and cover them with one of the various wall materials.

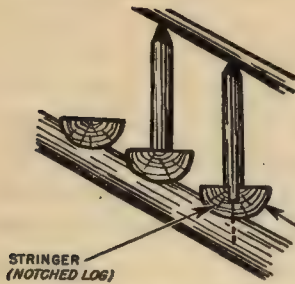
Although you doubtless will confine yourself to a one-story cabin, you nevertheless may have to build stairs. These may be outside, and lead to porches or doorways; or they may be indoors and lead to balconies. In fact, some cabin builders employ a balcony to provide an ingenious sleeping arrangement or a place for storing suitcases and supplies. By building bunks on balconies that are just high enough above the floor to provide ample clearance, economical use is made of space. A gable roof, especially if it is fairly steep in pitch, provides considerable space above the room. A simple balcony and stairs will use some of this space.

The balcony proper is supported by logs projecting from the wall. When there is a porch or other room on the opposite side of the wall, logs supporting the roof or ceiling can be extended far enough through the wall to provide balcony joists. When this construction is not possible, the joist logs for the balcony can be supported by knee braces set into the wall. Usually these braces will not be in the way. Still another method of supporting the balcony is to drop logs or poles down from the roof rafters or beams extending across the room.

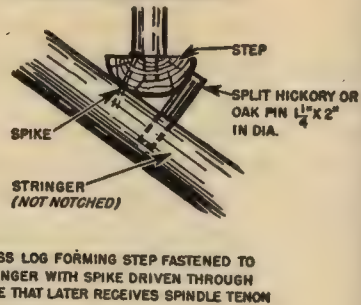
On the projecting log joists, lay slabs or split logs with curved sides down, where they will be visible from below. An ordinary tongue-and-groove floor can be laid over these.

CABINS AND RANCH HOUSES

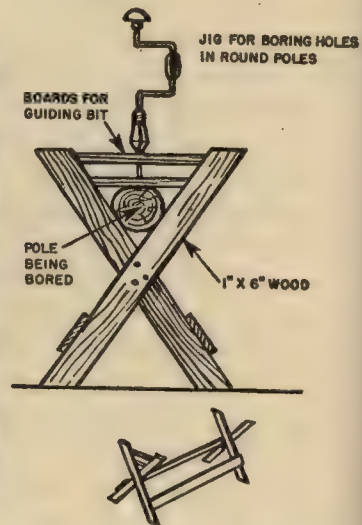
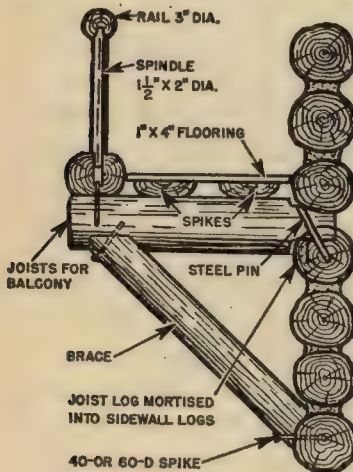
LOG STAIRS



ALTERNATE CONSTRUCTION



BALCONY DETAIL



The manner of building stairs and balcony is shown above. Also the best way of holding a log to bore a hole through it is shown.

The stairway leading to the balcony need not be very wide, a clearance of 2 ft. between wall and banister being adequate in most cases. The steps are split logs supported, with the flat sides uppermost, on two strong logs set at the proper angle and notched to receive the curved steps.

LOG CABIN PORCHES AND INTERIORS

The railing and spindles are made of small poles, and the supports for the railing are larger logs set on end.

Instead of employing a notched log for a stringer to support the steps, a plain log fitted with strong wooden pins can be used. The pins, which should be from 1 to 2 in. in diameter, and split from oak or hickory or made from peeled poles or branch sections, are driven into holes bored at right angles to the stringer and halfway through it. Steps are kept from shifting in the notch thus formed, by spikes driven through them and into the log below. It is best not to make the rise from step to step more than 8 in.

When using small poles for constructing banisters, furniture, and the like, the usual way of fastening the pieces together is with a type of mortise and tenon joint. The tenon is made by reducing the diameter of the end of the chair rung or spindle until it will fit into an auger hole an inch or so in diameter, depending on the size of the pieces employed, bored in the piece to which it is to be fastened. A nail, wooden pin, or sometimes glue holds the joint together. Hollow auger bits with adjustable cutting blades can be obtained for forming the tenons quickly. Bits are held in an ordinary carpenter's brace.

For holding round poles and logs while they are being bored, a simple boring jig can be made. This works exactly like the V-blocks used by machinists for drilling round shafting. To make the jig, nail pieces of 1- by 6-in. lumber or 2 by 4's together to form X-shaped uprights, and then connect these by boards 3 to 6 ft. long, running horizontally. This produces a jig resembling a saw-horse of a type commonly found near pioneer (and many present-day) woodpiles. The jig might easily be made of 4-in. poles. An added improvement, which is optional, consists of two cross-pieces, placed one about 3 in. above the other, and fastened to one of the X-shaped ends. With the bit to be used for boring the round poles, holes are bored carefully through these pieces, so that they will act as guides for later boring operations.

Chapter 8

MODERN LOG CABINS

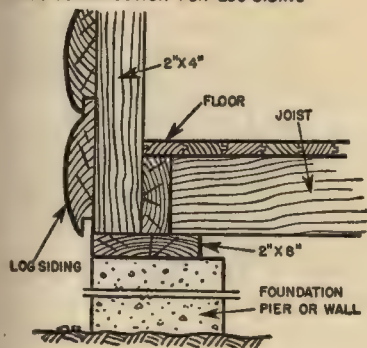
JUST because you cannot obtain a carload of real logs, you need not deny yourself the pleasure that a cabin gives. Manufacturers have modernized the log-cabin idea and made it available to everyone. In fact, the modernized cabin usually is cheaper in the long run than the genuine log variety. But if you insist on logs, and want to avoid much of the heavy work involved in their use, you can purchase ready-cut cabins of real logs of cedar or similar durable wood. These logs are selected for straightness and uniformity of taper, and are notched and otherwise processed in a woodworking mill. For instance, the logs furnished by one company for cabin building are grooved along top and bottom and at ends adjacent to openings, so that splines can be used to produce weather-tight joints without the necessity of chinking.

Such machine-made log cabins are shipped to the purchaser ready-cut throughout, so that all he has to do is put the pieces together in accordance with the plans; or if he desires, he can have the manufacturer take care of the erection as well as the preparation of material. Because of the work involved, the high grade of materials usually employed, and the all-around character of the cabins thus produced, the final cost may be somewhat higher than when ordinary log-cabin building methods are followed or when some of the log substitutes are used.

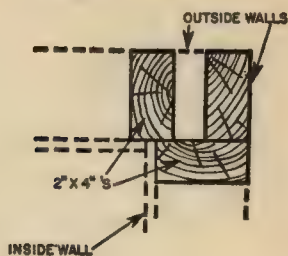
These log substitutes are sided cut to look like round or hewn logs, and machined so that the edges overlap to pro-

MODERN LOG CABINS

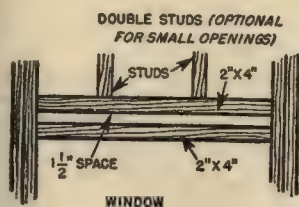
SILL CONSTRUCTION FOR LOG SIDING



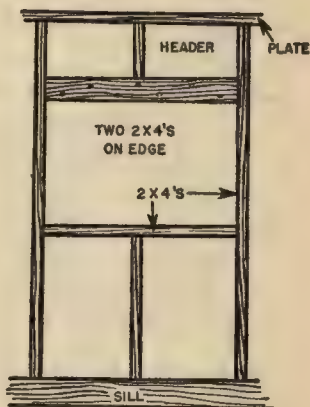
ONE FORM OF CORNER POST



FRAMING WINDOW OPENING (ALTERNATE METHOD)



THIS CONSTRUCTION PREVENTS BINDING OF WINDOW. UPPER 2X4 HEADER CAN BEND UNDER ROOF WEIGHT WITHOUT CAUSING WINDOW TO BEND

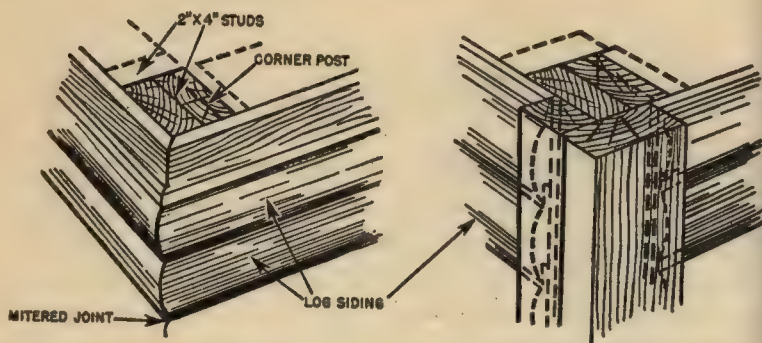


LOG SIDING IS MADE WITH ROUNDED FACE LIKE WHOLE LOGS AND WITH SHIP LAP EDGE SO THAT EACH PIECE FITS SNUGLY INTO THE NEXT ONE

These illustrations show the proper manner of building sills, walls, and windows when log siding is used in a cabin.

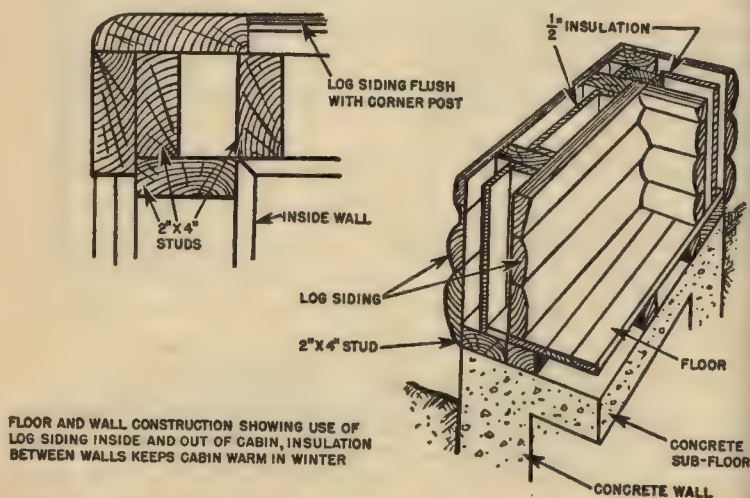
CABINS AND RANCH HOUSES

TWO METHODS OF BUILDING CORNERS FOR LOG SIDING



DOTTED LINES SHOW METHOD OF FRAMING CORNER POST WHEN THE INSIDE IS TO BE SHEATHED, IN WHICH CASE THREE STUDS WILL BE NEEDED INSTEAD OF TWO

ROUNDED CORNER CONSTRUCTION



FLOOR AND WALL CONSTRUCTION SHOWING USE OF LOG SIDING INSIDE AND OUT OF CABIN, INSULATION BETWEEN WALLS KEEPS CABIN WARM IN WINTER

Here are the best ways of finishing corners when log siding is used.
Note also the manner of floor and wall construction.

MODERN LOG CABINS

duce weather-tight joints. Woods from which they are made vary. Here are some of the log-cabin sidings available at most lumber dealers:

White pine and Norway pine: Outside surface rounded to resemble a peeled pine log. Inside surface flat and smooth, for nailing to studs. Ship-lap joint used at edges, each board overlapping the one below to produce a water-tight joint. Comes in natural pine color, and can be left to weather without further treatment, or covered with shingle stain, clear creosote, or varnish. Available in 2 by 6, 2 by 8 and 2- by 10-in. sizes, and in lengths of 6 to 16 ft.

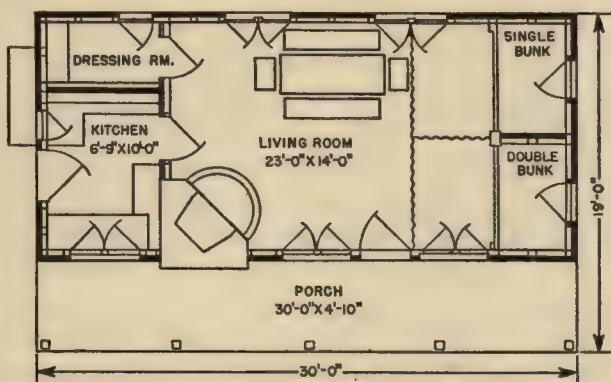
California Pine and Incense Cedar: Outside surface rounded to resemble peeled logs, or flat and beveled to resemble hewn logs. Pecky cedar siding is made from cedar that contains irregular openings or holes that were formed by fungi while the trees were standing. These holes, which may be several inches long, produce an attractive rustic appearance. Round log siding of these woods is made in 4-, 6-, 8-, 10- and 12-in. width, $1\frac{1}{2}$ in. thick; and in 6-, 8- and 10-in. widths, $2\frac{3}{8}$ in. thick. Joints usually are single-lap, but can be double-lap in the 10- and 12-in. sizes. Hewed log siding is produced at the factory with a flat surface, and can be textured with an adz or broadax on the job, to make it look more realistic. It comes in 8- and 10-in. widths, $1\frac{1}{2}$ in. thick, and 8-, 10-, and 12-in. widths, $2\frac{3}{8}$ in. thick. California Pine and Incense Cedar can be left to weather naturally, although a preservative consisting of one part turpentine and two parts linseed oil has been suggested by the manufacturer. This is applied with a brush, and it darkens the wood very slightly. Oil stains can be added if desired.

California Redwood: Several types of log-cabin siding made of redwood are available. The natural resistance of this wood to weather, and its pleasing color make it attractive for imitation log cabins and similar structures. The wood is easily worked, and need not be protected with a pre-

CABINS AND RANCH HOUSES



This attractive cabin suggests a western ranch house with far-extending eaves and a pergola porch. (*Courtesy, Shevlin Pine Sales Co.*)



This floor plan of the preceding cabin shows how the best use is made of all available space. (*Courtesy, Shevlin Pine Sales Co.*)

servative. It is more resistant to termite invasions than most other materials.

Pecky Cypress: This is a kind of cypress that, like pecky cedar, contains more or less scattered cavities that give it a

MODERN LOG CABINS

honeycomb appearance. The cavities are caused by a certain fungus that affects the wood only while the tree is alive. Although the wood may look badly decayed, it nevertheless is sound and strong. The decayed appearance enhances its value for log-cabin siding. Pecky cypress log siding is made from boards 2 in. thick and 6, 8, and 10 in. wide. Cypress, like redwood, is inherently resistant to decay and weather action. Therefore the log-cabin siding can be left untreated, or it can be stained, treated with the linseed oil-turpentine filler, or otherwise finished.

Log siding, no matter what the wood or the shape, is applied to a frame of conventional construction. This frame is built mainly of 2-in. lumber 4 in. or more wide. For the average cabin, nothing complicated in the way of a frame is necessary. Simply use the pieces of lumber where they are needed, and make every piece serve a useful purpose. On the other hand, do not skimp on materials when framing the cabin, for the strength and life of any structure depends on the soundness of its frame timbers and the manner in which they are fastened together. Pine and cypress are among the usual materials employed for frames, although some builders use redwood for the underparts of the structure to lessen decay and damage from termite attacks.

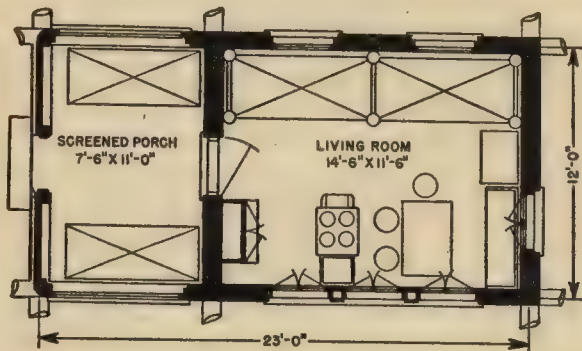
When the foundation has been made ready, your next step is to construct the sills, set the floor joists, and erect the studding, corners, and plates. There are numerous ways of building sills. For the one-story cabin that rests either on piers or a solid foundation, the following simple method will serve:

Determine the size of joists you will have to use. For a 12-ft. span, use a 2-by 8-in. joist; for 16-ft. span, a 2 by 10; for 20-ft. span, a 2 by 12. It is assumed that you will use only sound boards, free of weak knots, for such load-carrying members as the joists. In fact, sound lumber should be used throughout if the building is expected to give long

CABINS AND RANCH HOUSES



Here is an excellent cabin for hunting or fishing. The screened porch furnishes an extra room. (*Courtesy, Page and Hill Co., Minneapolis, Minn.*)



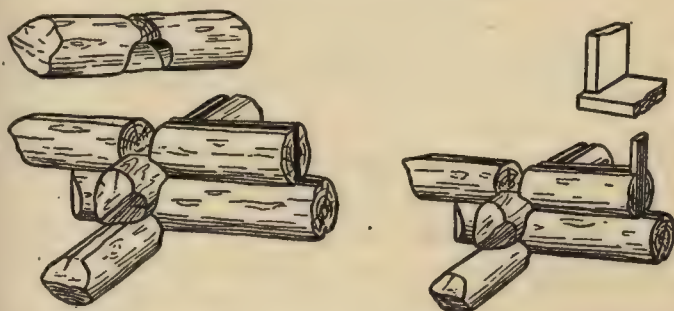
This floor plan of the cabin shown in the above illustration gives a good idea of the simplicity of its construction.

service. By running a beam down the center of the floor and installing additional piers, the required sizes of joists can be reduced.

The base of the sill is a 2- by 8-in. board laid flat, with its outer edge even with the outside surface of the pier or wall. This is to keep water from running in. It is not a bad idea to cover the top of the foundation with a thin layer of cement mortar and lay the board in it, to produce a tight joint that will reduce decay by keeping out water. Before laying this board permanently, measure in from the outside

MODERN LOG CABINS

edge the width of the 2-by-4 studs, and set on edge a board that is the same width as the joists to be used. Spike the two boards together. The resulting construction looks, in cross section, something like the letter L with a heel projecting back. The ends of the joist rest on this heel, and are fastened with spikes to the board that is resting on edge. Set all joists, and later the studs, on 16-in. centers.



The sketch at left shows how ready-cut logs are notched and grooved and put together in building a corner. At right, how doors and window frame splines are fitted snugly into the logs.

Studs can be erected one at a time, or assembled into framework on the ground and erected as a wall unit. The method depends largely on the number of men available. The lower ends of the studs rest on the horizontal 2 by 8, and against the vertical board spiked to the joist ends. Fasten the studs securely. Upper ends of studs are fastened to the plate, by spikes driven through the plate and into the ends of the studs. The plates may be single or double 2 by 4's. At the corners, 2 by 4's are spiked together to form a corner post. There are several ways of making such a post. If no interior finish, such as veneer paneling, is to be applied, a simple post made by nailing two 2 by 4's together will serve. Where it is desired to form a ledge for nailing finish, three 2 by 4's can be arranged as shown on pages 73 and 74.

CABINS AND RANCH HOUSES

The making of window openings is not difficult. Although such openings can be made easier in the frame when it is being assembled on the ground, many carpenters prefer to cut out the openings after the studs are up. They say a truer job can be done in that way. This method looks like a waste of material, but the cutout pieces are used for making cross pieces or headers, and for other purposes. For windows whose width is not much more than the distance between two or three studs, a single 2 by 4, placed with its widest surface horizontal, will serve as a header. For wider windows, such as the casement types most suitable for low, rambling cabins, it is advisable to place two 2 by 4's on edge, or else use a 2- by 6-in. plank with its face vertical. Remember, the header has to support some of the weight of the roof and other construction above it. It is not a bad idea to double the studs along door and large window openings, for added strength and ease of sash and door operation.

The fastening together of wall framing at the corners consists mainly of tying together the plates. When the building is small and single plates can be used all around for rafter supports, miter joints are made at the corners, the plate ends being spiked to the corner posts. Usually the side plates, which support the rafters, are made by laying one 2 by 4 on the other and nailing them together. When this is done, it is easy to make a lap joint at a corner, the lower half of the doubled plate butting against the end plate, and the upper half overlapping it. For further rigidity, blocks can be nailed in the angle between the corner posts and ends of plates.

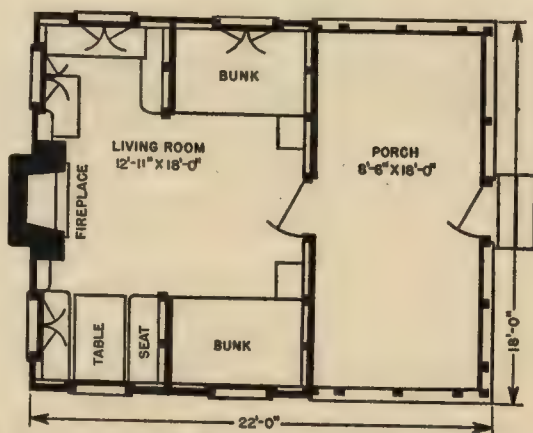
The siding can be applied to the frame before the roof framework is erected.

The majority of log houses and their near relatives have simple gable roofs. Framing a roof out of sawed lumber for a cabin using log siding is essentially no different from simi-

MODERN LOG CABINS



Here is a complete one-room cabin with a porch. This is an extremely simple and easily built cabin. (Courtesy, Shewlin Pine Sales Co.)



Here is the floor plan of the one-room cabin shown above. Built-in bunks leave a large living room.

lar framing for a true log house. Rafters usually are of 2-by 4-in. lumber, and the ridge piece is a 2 by 6.

Cutting rafters seems to be about the most difficult part of roof framing. Suppose, for example, that you want to cut a set of rafters for a quarter pitch roof, one that, in other words, has a rise of 6 in. every foot, or a height equal to one

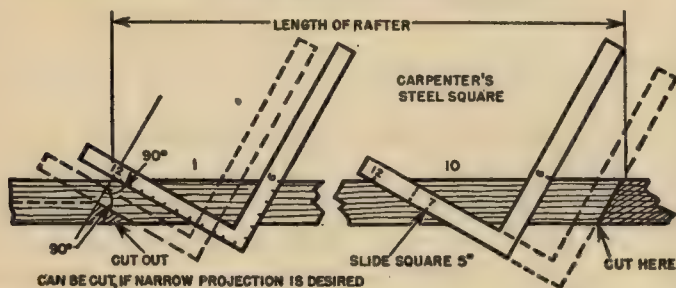
CABINS AND RANCH HOUSES

fourth its span measured between the outer edges of the plates.

Look at the steel square when it is placed with the blade or longer part vertical and the tongue or shorter part extended to the left. If you draw a line through the figure 12 on the tongue and the figure 6 on the blade, the pitch of the line will be one-fourth. The pitch, you remember, was defined as the span of a roof divided by its height. The span

LAYING OUT 1/4 PITCH RAFTER WITH STEEL SQUARE

SPAN = 20 FEET-10 INCHES



By using a steel square, as shown, you will have no trouble laying out the pitch of rafters for your cabin.

in this case would be 24 in., since the part of the square from 0 to 12 in. on the tongue represents only half of the distance across the base of the roof,—half of the span, in other words.

Now to lay out and cut a master rafter that can be used as a pattern for the others: The object is to find the proper length; and to determine bevels for the upper ends, where the rafter meets the one from the opposite side, and the lower end, where it rests on the plate. Assume that the roof span is 20 ft. 10 in., and that you want the rafter to project 12 in. beyond the plate at the cornice. The pitch, you remember, is one fourth.

If you want the full width of the rafter to extend for the

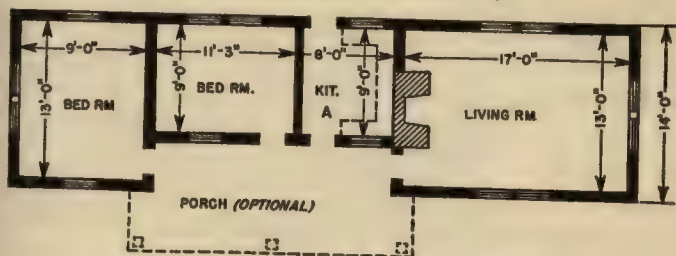
MODERN LOG CABINS

cornice, it is necessary to cut a notch so that it will fit over the plate. An alternate way is to make the projection one half the width of the rafter. Either way, the first thing is to mark out the notch. At a distance of 12 in. from the end of the 2 by 4, make a mark. With the square held so that the



Early American history is recalled in this log cabin which is designed along lines similar to those used by the first settlers.

(Courtesy, Red River Lumber Co.)



Here is the floor plan of the early American cabin.

(Courtesy, Red River Lumber Co.)

tongue is at the bottom and to the left of the blade, place the 12-in. mark on the tongue at the mark you made at the edge of the rafter. This is the starting point. The length of the rafter will be the distance from this point to the point, on the same edge, where it meets the rafter from the opposite side. With the 12-in. mark on the tongue as a pivot, swing the square until the 6-in. mark on the blade is directly over the same edge of the board. The square is now set for the proper pitch. Make a mark along the lower edge of the

CABINS AND RANCH HOUSES

tongue. Turn the square around and draw a line across the 2 by 4 at right angles to the first line, and intersecting it at the starting point. Mark the mid point on this second line. Again placing the square with the figures 12 and 6 over the edge, move it to the left until the lower edge of the blade intersects the mid point on the second line you drew. From this point to the lower edge of the board along the blade, draw a third line. This line and the one it intersects indicate where the notch should be cut.

Now to lay off the rafter length and mark the upper bevel, or plumb cut: Again place the square with the 12-in. mark of the tongue at the starting point and the 6 of the blade over the edge. Mark the point where the 6 falls, and move the square along until the 12 of the tongue rests at that point. Continue this until the square has been placed at the 12 and 6 marks 10 times along the rafter. (The span was 20 ft. 10 in., half of which, or 10 ft. 5 in., is considered because you are laying off one half of the roof.)

Now for the remaining 5 in. With the square in its 10th position draw a line along the lower edge of the tongue, and make a mark on it exactly 5 in. from the 12-in. mark on the tongue—at the figure 7, in other words. Now slide the square along this line until the figure 12 on the tongue is at the mark. Scribe a line across the 2 by 4 along the lower edge of the blade. Cut along this line, and cut out the notch at the other end, and your rafter is complete. If a ridge piece comes between the upper ends of rafter pairs, allow for it by deducting half its thickness from the length of each rafter, measured perpendicularly from the beveled end of the rafter. In the above example, the deduction could be made by subtracting from the 5 in. when marking the upper end bevel.

This system is applicable to all roof pitches. You will note that you do not necessarily determine the actual length of the rafter. Always set the 12-in. mark on the tongue at the

MODERN LOG CABINS

starting point. To determine what other number to use for a given pitch, multiply 24 by the pitch. Thus for a one-third pitch, the second number would be 8; for a one-half pitch, 12; for a three-quarter pitch, 18 and a one pitch, 24.

The cutting of more complicated roofs, such as the hip and valley type, involves a somewhat more intricate manipu-



Here are two views of a desirable log cabin. One shows it with an open porch and the other with a one-car garage.

(Courtesy, Red River Lumber Co.)

lation of the square. If you tackle such a roof, it is suggested that you consult a capable carpenter or a steel square instruction book.

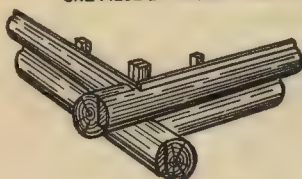
The rafters are fastened to the ridge piece and the plates with suitable nails. They are further anchored at the lower ends, in most frame structures, by ceiling joists extending across the building from one plate to the other, and nailed to the sides of the rafters. The projecting corners of the

CABINS AND RANCH HOUSES

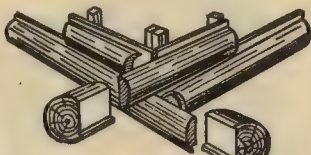
joists are cut off to correspond to the slope of the roof. Sheathing boards over which shingles or other roofing materials are placed run across the rafters and project the desired distance at each gable end.

There are various ways of finishing the cornice. For a cabin of almost any type, a simple open cornice is suitable, and possesses the advantage of being cheaper than

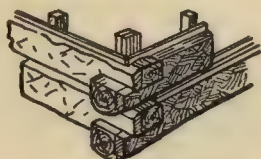
ONE PIECE EXTENSION ENDS FOR ROUND LOG SIDING



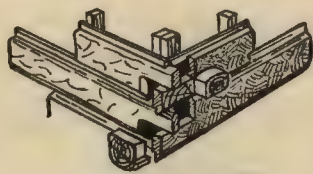
COMPLETED ROUND LOG
EXTENSION CORNERS



OPENED EXTENSION ENDS
TO SHOW CONSTRUCTION



COMPLETED "HEWED LOG"
SIDING EXTENSION ENDS



OPENED EXTENSION ENDS TO
SHOW METHOD OF FINISHING

If round log siding is used, the appearance of real logs can be secured by finishing the corners as shown. Corner construction with hewed logs is also shown.

others. The siding is fitted up over the plate and between the rafters, until it meets the sheathing. A strip can be nailed along the joint, to exclude the weather.

The application of the log-cabin siding probably will prove to be the most interesting part of the cabin construction. The siding, other than being somewhat heavy in some sizes, is easy to handle, cut, and nail when made of any of the woods mentioned. The bottom board is nailed in place first, care being taken that it is straight and level. Then the lower edge of the next board is fitted over it and fastened. This is continued until the wall is covered. The simple win-

MODERN LOG CABINS

dow and door frames that you will install can be placed before the siding is put up, the siding boards being cut square at the ends and fitted closely against the frames. The siding can be all the same width, or it can be of two or three widths applied in random fashion to simulate real logs.

There are numerous ways of constructing corners. Perhaps the simplest is to make a miter joint where the siding boards come together. When this construction is employed, care must be taken to have boards of the same widths intersect.

A variation of the mitered corner is produced by butting the ends of the siding against the edges of boards of the same thickness forming corner posts.

For a wall having high heat-insulating value, log siding can be used for covering both the inside and outside walls, and a layer of insulating material placed in the space between the two walls. Follow manufacturer's instructions for the type of insulation used.

An interesting treatment is to let every alternate board end at a given corner project beyond the adjacent board on the other wall. The ends are then chopped off either squarely or at an angle, with a hatchet or ax. The result resembles real log construction.

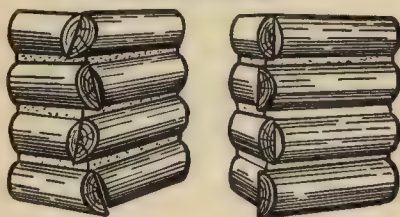
To provide an even better imitation of real logs, a manufacturer designed extension ends for log siding. When hewed log siding is applied, each board is halved for a distance of several inches from the end, the wood being cut away from the lower half of one board and the upper half of the one from the adjacent wall that intersects it. When the siding is in place, these halved ends project the required distance, which is 2 to 4 in. for hewed logs. To these projections are nailed log extensions of the same length. These extensions come in the form of milled beams that can be cut to any desired length. They are of such shape that, when a section is attached to the siding projection, it completes the log

CABINS AND RANCH HOUSES

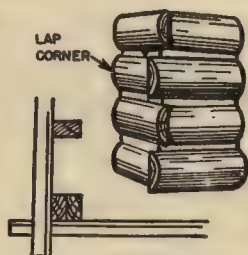
form, producing a strikingly realistic appearance. When the job is neatly done, the seams between siding and projections are hardly noticeable. For round log siding, every alternate board projects 8 to 12 in. for its full width, and the extensions attached.

LOG SIDING CONSTRUCTION

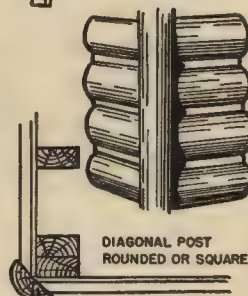
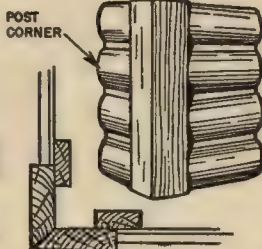
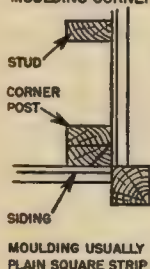
LAP CORNER WITH SIDING ENDS CHOPPED OFF DIAGONALLY



CORNER DETAILS



MOULDING CORNER



In building cabins with log siding, the corners can be finished as shown here.

Another attractive corner is produced by lapping alternate ends of the siding boards, letting the top one project an inch or two beyond the surface of the other. This is an arrangement similar to that employed for chopped ends, but is not quite as rustic. A neat corner is produced by butting the siding ends against a small moulding or square wood bar. A larger post or a real log can be used, the siding ends being butted squarely against its sides, or chamfered roughly

with an ax. Another treatment involving a post is to bevel the ends of the siding to an angle of 45 degrees with the wall surface and then fasten a half-round post over the ends.

As already pointed out for real log cabins, the ways of finishing the interior are almost beyond number. Some builders leave the interior unfinished for the first year or two, as a matter of economy. One of the most popular finishes is produced by applying, to the interior walls, log siding like that used outside. The siding can be arranged in rows that come together evenly at the corners, where the ends are cut on a 45-degree miter and fitted together; or the boards can be staggered to simulate real logs, the ends coming together in butt joints made to fit by proper cutting with a scroll saw. Pole-house construction is imitated by running the siding vertically. Incidentally, modernistic interiors have been produced by setting round-log siding vertically and then painting it with white enamel or similar finishing material.

Another popular finish is knotty pine or similar plywood. Redwood, pecky cypress, ordinary cypress converted into Sugi wood, knotty pine boards, and a score of other materials treated in a hundred different ways, can be employed. The builder has ample opportunity to exercise his ingenuity in the matter of interior finish. He should, however, avoid materials that fail to harmonize with the rest of the structure, or are otherwise undesirable. Plastered walls are seldom used for vacation cabins because they are costly and seem out of place.

Fancy and extensive interior trim is undesirable. Simple door and window casings or no casings at all, are the rule. The casing of a door, either through a partition or in an outside wall, might well be a hewn beam or made of hewn log siding. When log siding is used for wall covering, no baseboards are necessary, the lower siding strip serving that purpose. Knotty pine boards and plywood usually run all the way to the floor, with only a very narrow mold strip along

CABINS AND RANCH HOUSES

the intersection. Many of the finishing suggestions made in connection with real log cabins can be applied to the machine-made kind. The same is true of roofs and porches. In fact, it is desirable to work real logs and poles into the log-siding house when such materials are available. Porch posts, projecting rafters and other visible parts of the framework look better in rustic form.

Where the cost of applying interior wall covering to a cabin, especially one used only in summer, is to be avoided, studding and other framing can be left exposed and finished with stain or paint. With a plane or edging tool, knock off all sharp corners of studs and other framing members within normal reach. A very light antique pine, maple, or driftwood stain followed by two coats of clear shellac will produce a pleasing finish on exposed interior surfaces.

Chapter 9

OTHER TYPES OF CABINS

THE log cabin and its modern brother, the frame house with log-cabin siding, by no means enjoy a monopoly among recreational structures. If you have a lake-shore lot, an acre in the woods or mountains, or a site for a tourist camp or other commercial venture, there are many cabin types from which to make a selection. The design and elaborateness of the cabin will be governed largely by the way it is to be used. For instance, a hunting or fishing shack in the woods need not be an elaborate structure, but may be only a wood shell to protect its occupants against storm and the night. On the other hand, a cabin in the woods, which will be used as a year-round retreat for the entire family or even as a permanent residence, will be substantial, weather-tight, and attractive. Many of the so-called "ranch houses" are, basically, cabins . . . at least, they often show the cabin influence.

From the rural barn, you can get inspiration for a very cheap type of cabin or cottage, yet one that will not be an eyesore and will be staunch and comfortable, if well built. Being "well built" does not mean that it will be costly, but only that its parts are assembled in a workmanlike manner. This cabin has simple walls of boards set vertically, the cracks between them covered with battens—strips of wood nailed securely in place.

A framework of 2-in. lumber—2 by 4's for small structures—is built, to form a support for the wall boards. This frame is the essence of simplicity, consisting of sills along each wall, corner posts and wall plates at the top. For added

CABINS AND RANCH HOUSES

stiffness, 2 by 4's can be set diagonally, and arranged so that they will miss window and door openings; or these openings can be placed where they will not interfere with the braces. The sills rest on low piers, which can be flat stones laid on the ground. Joists, massive enough to support the floor, extend across the structure, and are spaced every 20 in. or so. By generous placing of piers beneath the floor, 2- by 4-in. joists can be used. They are fastened to the sills simply by being laid on top of them and toenailed in place, the ends of the joists being even with the outer edges of the sills.

Ordinary sheathing boards 1 in. thick and about 12 in. wide are employed for the walls. They are nailed to the sills, plates and corner posts. At door and window openings, 2 by 4's are used for framing, to increase the rigidity. After the boards are set in place and fastened to the frame as firmly as possible, the cracks are covered on the outside, and on the inside as well if desired, with battens or strips 3 or 4 in. wide and $\frac{1}{2}$ to 1 in. thick.

As for the roof, it can be of the gable type already described, or a simple shed roof made by laying the 2- by 4-in. rafters across the plates and spiking them in place. The shed roof has to have some pitch, something like a rise of 1 in. per foot, to enable the water to drain off; so it is necessary to make one of the sidewalls lower than the other, and slope the tops of the end walls. Composition roll roofing is suitable for such roofs, and is applied over sheathing made of the same kinds of boards that were used for the walls. Windows of the casement type, swinging inward or outward, are easy to make. Simply set the sash in a frame made of 2- by 4-in. boards, hinging it at one side and providing a fastener at the other, and nail stops all around, to keep the weather out. Slope the sill—the lower part of the window frame—downward, so that water will not stand on it. The door frame can be made of 2 by 4's or 2 by 6's, suitable stops being provided. At the outside wall corners, two battens of

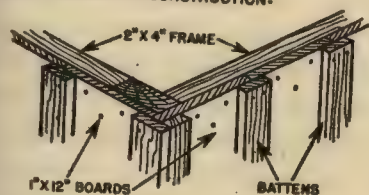
OTHER TYPES OF CABINS

different widths should be nailed together to form a trough-like covering, and placed so that the joint between boards is covered by the wider batten.

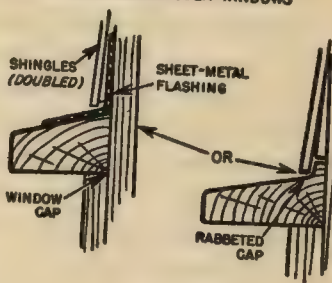
"Such a cabin would be an eyesore," you may exclaim.

True, there are thousands of such buildings that are most objectionable eyesores. The reason is not primarily with the method of construction, but with the general state of disrepair, the lack of paint or other decorative material, and

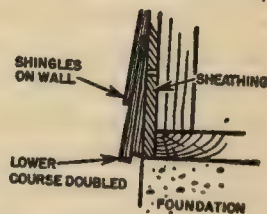
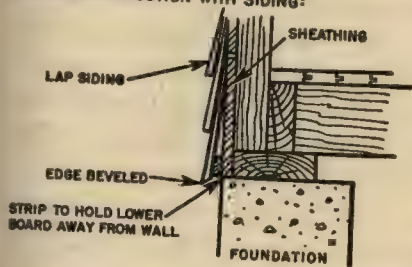
BOARD AND BATTEN CONSTRUCTION:



APPLYING SHINGLES OVER WINDOWS



FRAME CONSTRUCTION WITH SIDING:



Some ways of finishing walls of a cabin or other building having a conventional frame.

junky surroundings. By judicious use of paints or stains, you can employ the board-and-batten arrangement as the basis of an interesting wall design. For instance, the boards may be painted a light buff, the battens, window frames, window sash, and door frames a rich brown, and a dark brown roof installed. Another combination would be light green or straw-colored boards with dark green battens and trim and brown roof. Still another combination particularly for a

CABINS AND RANCH HOUSES

lake-shore cottage, would be white boards and blue battens and trim, with a brown or red roof. In the woods, various tones of brown, in stain or paint, can be used all around.

Additional improvements in appearance can be made by adding a stone or brick outside chimney, and by judicious use of shrubs, vines, and flowers about the structure. In fact, by exercising a little care, this simple board-and-batten cabin can be made charming and livable. The matter of interior finish and arrangement is one that can be settled according to personal tastes.

With a conventional wood frame, such as that described in the chapter on log-siding cabins, as a starting point, numerous effects can be obtained simply by selection of different outside wall and roof coverings. The builder has at his disposal a variety of wall finishes including ordinary clapboards, drop siding, shingles, shakes, and composition materials made to imitate bricks or shingles.

The terms applied to various types of siding vary somewhat with locality. In some parts of the country a "clapboard" is something that is used to cover outside walls, corresponding to the weatherboarding or siding of other localities; to old-time cabin builders the clapboard is an overgrown shingle split from logs 24 to 36 in. long and used mainly to cover roofs; while the modern term for this split board is "shake." Some persons think that a shake is the same as a shingle, but it is not. There is a difference in size and method of laying, as will be shown presently.

The application of weatherboarding to outside wall surfaces involves a few simple tricks that every builder should know. Whether the siding is applied directly to the studs, whether building paper is used beneath it to increase weather resistance, or whether the framework is first sheathed with 1-in. boards of pine or other cheap wood, and the paper is used between the sheathing and siding or sheathing and studs, are matters to be determined by available funds, the

OTHER TYPES OF CABINS

degree of weather resistance required, and the type of interior finish.

Assume, for the time being, that the cabin is to be used in winter as well as summer, and that maximum weather protection is required. The outside surfaces of the studs will be covered with the sheathing boards, placed either horizontally or diagonally, with very narrow cracks or none at all left between them. Opinions differ as to whether there is any particular advantage in running the sheathing diagonally. Some builders claim that it gives a stiffer structure. At any rate, it is slightly more costly, for some wood and time are lost in cutting diagonal ends.

After the sheathing is in place, a strip of building paper is run horizontally along the bottom of the wall, and tacked so that it will remain in place while the boards are being applied.

For utmost protection against weather and consequent rotting of sills, a water table is desirable. This is a construction along the lowest edge of the outside finish, for the purpose of diverting water away from the boundary between foundation and sill. A simple way is to tilt the lower edge of the first weatherboarding piece outward an inch or so, and block under it with a flat board whose upper edge may be beveled. Another strip is placed beneath the siding, near the edge, to seal the triangular opening created. In most cases, the construction of an elaborate water table can be omitted without causing trouble for many years. It is a good idea to bevel the lower edge of the first board, so that the outer corner is sharp, permitting water to drip from it. Place the board so that the edge extends slightly below the bottom of the sill.

When lap siding is used, the amount of board width exposed to the weather can be varied. This permits the pieces to be spaced so that it will not be necessary to cut the siding below windows. Tongue-and-groove weatherboarding can-

CABINS AND RANCH HOUSES

not be varied in this way. Corner boards may be used with weatherboarding, or the ends mitered and butted, with perhaps a protective metal cap added.

Shingles are popular for covering the outside walls of cabins, cottages, bungalows, and lodges because of the variety of decorative effects that can be obtained with them.

APPLYING SHINGLES:

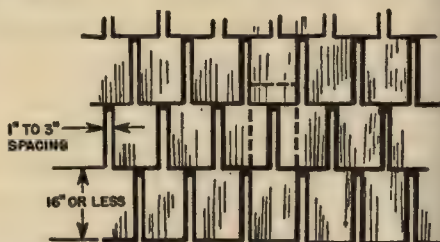


APPLYING SHAKES:

SHAKES MEASURE

$\frac{1}{2}$ " x 6" x 36"

UP TO 16" EXPOSED



Above, two ways of applying shingles. Below, suggested arrangement of shakes. Either shingles or shakes used on roofs should have somewhat less of their lengths exposed to weather than when used on walls.

They are not difficult to apply and last a long time. Because they can be stained almost any color, shingles are at home in the city, at the sea or lake shore, in the mountains, or deep in the forest. Shingles, when laid properly, are better heat insulators than weatherboarding. There is not a great deal of difference between the cost of shingles and of weatherboarding.

Shingles applied to sidewalls can have more area exposed to the weather than when they are used on roofs because water will drain off easier. A less expensive grade of shingles will serve for walls than for roofs. Otherwise, there is little difference in the methods of applying them.

OTHER TYPES OF CABINS

Shingles are obtained in various sizes, the standard including 16-, 18- and 24-in. lengths. The 18- and 24-in. sizes are commonly used for walls. Shingles 9 in. or less in width are preferable. If wider, they should be split. There are no set rules for determining the amount to leave exposed to the weather. Generally, for roofs, the 16-in. shingles are laid with 5 in. to the weather; 18-in. shingles with $5\frac{1}{2}$ in., and 24-in. shingles with 10 in. On walls, the exposure can be an inch or so greater, for a given size.

If a water table is used at the bottom of the wall, the lower course of shingles is forced outward at the bottom by wood strips. Thus the shingles are slightly curved, throwing the water outward away from the foundation. Generally a water table is not used. In either case the lower course of shingles is doubled. This makes it possible to use the faulty shingles that will be found in almost every lot. The top layer of the first course can be set a fraction of an inch lower, so that their bottom edges will project enough to hasten the escape of water.

In order to produce even rows, a straight-edge is employed. When the first course is being started, shingles are tacked in place at the ends. Then the straight edge is placed against their lower edges and fastened temporarily. Subsequent shingles are placed with their butts or thicker ends resting on the straight edge. The straight edge is moved upward, being kept level, for successive courses. If desired, a line drawn taut can be employed instead.

As with lap or clapboard siding, the kind that does not have tongues and grooves, shingle exposure can be varied so that the courses will be even with windows at bottom and top. Of course, it will be necessary to cut off some of the shingles when a window is reached, but the pieces can be used above it. The window cap generally is rabbeted so that a ledge projects upward for $\frac{1}{4}$ in. or more to hold the shingles outward from the wall the necessary distance. Double

CABINS AND RANCH HOUSES

the shingles above doors and windows. Fasten shingles with zinc-coated or copper, aluminum, or stainless-steel 3- or 4-penny shingle nails, driven so that their heads will be covered by the layer above.

At the corners, the shingles can be extended until those on one surface overlap the edges of those on the other surfaces. The over-lapping shingles are trimmed to conform to the outer wall surface, with a knife or hatchet. Corner boards can be used, if desired, to produce a trimmed appearance. The boards are set in place over the sheathing, and the shingles butted snugly against them.

The common way of applying shingles is to have their exposed ends form even horizontal rows. They are, of course, staggered so that each shingle covers the joint between two in the next lower course. Variations in the arrangement can be introduced. One way is to set every alternate shingle in a given course a fraction of an inch higher than the others in the same course. A saw-toothed effect is produced, which is less monotonous than orderly lines.

The woods most generally employed for shingles include cypress, redwood, and western red cedar. Incidentally, these woods are used widely for weatherboarding, with spruce, white pine, fir, and hemlock increasing the list in some sections.

Shakes are essentially overgrown shingles used for roof and sidewall covering. The California Redwood Association has given suggestions for making shakes from redwood. This material is particularly suitable for such uses because it contains no tar or pitch, is straight-grained, and is naturally resistant to decay and insects. Shakes may be made of redwood by sawing or splitting. Special splitting tools having long cutting edges are used. The standard size is 36 in. long, 6 in. wide and $\frac{1}{4}$ in. thick. A standard bundle contains 25 shakes of this size. They are laid generally with 14 in. exposed to the weather, which produces high heat-insulation

OTHER TYPES OF CABINS

value. There is no strict rule for amount of exposure. No. 1 clear vertical grain redwood is the grade frequently employed for shake making.

In applying shakes, set them from 1 to 3 in. apart. This differs from shingle-laying practice, where the pieces are placed closely together. Do not use ordinary iron or blue lath nails for applying shakes. Zinc-coated or hot-dipped galvanized nails are recommended. Use the 4-penny shingle-nail size, two nails per shake.

The number of shakes required for a square (100 sq. ft.) of surface varies with the spacing and exposure. Some values are given by the California Redwood Association as follows:

Exposure to weather	1 in. spacing	2 in. spacing	3 in. spacing
12 in.	172	150	133
14 in.	147	129	113
16 in.	130	113	100

At 2 nails per shake, the number can be determined easily. The nails will run from 250 to 275 per lb.

Of much interest to the prospective cabin owner who does not want to spend much time and effort in playing the part of carpenter or contractor, there are available sectional and pre-cut buildings of types and sizes to meet vacation or permanent home needs.

The pre-cut building idea has been applied extensively to cabins, cottages, garages, and the like. The sills, rafters, joists, and other essential framing parts are cut to size and shape in a factory, numbered and shipped to the purchaser together with the proper amount of roofing material, weatherboarding, hardware, nails, and paint. Putting up a pre-cut building consists mainly of following directions and driving nails or tightening bolts. For the man who wants to econo-

CABINS AND RANCH HOUSES

mize on tools and time the pre-cut idea is valuable. Furthermore, waste of material on the job is eliminated, and unskilled or semi-skilled labor is satisfactory.

A sectional building is one that is made and assembled, as far as practicable, in a factory. Wall panels or entire walls, depending on the size of the structure, are built with modern machinery and under favorable shop conditions. These panels contain the necessary window and door openings. When the customer signs on the dotted line, a set of panels, together with other essential parts, are shipped to the building site, where they are set in place and fastened together. The customer buys only the materials that are actually used. Companies using the sectional principle of erecting houses may, because of transportation and similar limitations, operate only in certain areas: for instance, a concern in Cleveland, Ohio offers a complete planning and erection service in Ohio and nearby states. Wall panels and other units are prepared at a central plant and erected on the building site by trained craftsmen. Or the customer may, if he prefers, purchase the panels and other parts and do the erecting himself, thereby saving on the cost. As a rough approximation, cost of the materials for a sectionalized building may be about one-third the current market value of the completed structure.

One form of sectional cottage is assembled from factory-made units built of standard 1-in. drop siding in short lengths, the ends being fastened by vertical strips of wood arranged so that adjacent sections fit together with a tongue-and-groove joint, something like standard siding or flooring boards placed on end. These strips serve as studs. Sections are of a size that permits them to be handled easily by two men, their width being about 3 ft. and length about 7 ft., the height of the usual cottage wall from sill to wall plate. The sections are fitted together and bolted along sills and plates.

OTHER TYPES OF CABINS

If you are planning a hunting lodge or other outdoor cabin, the sectional idea may appeal to you for several reasons. By buying the sections ready-made you pay only for material used and the labor involved in making the units. By working out your own sectional design and constructing the units where power tools are available, you can eliminate much of the hard work involved in hauling excess lumber and other material to the cabin site, and in working with hand tools. Transportation of material to a remote location, such as a retreat deep in a forest, involves certain difficulties and costs. If these can be lowered by eliminating hauling of waste material, so much the better. A sectional cottage can be put together in a day or so. Prime coats of paint are applied at the shop, so that only one additional painting is necessary after the building is set up.

Of no little importance to many cabin owners, particularly when the cabin is to be used as a hunting or fishing lodge, is the fact that a properly designed sectional structure can be taken apart and transported to another site, with practically no loss of material. Sometimes a cabin site is leased for a few years, or is in a national or state forest where permission to use the ground is granted for specified periods and can be released at any time, with the privilege of moving the cabin or selling it to a new permittee.

It is possible to design a sectional house so that walls, roof, and floor are in panels that can be taken apart. Generally it would be advisable to cover the roof in the usual manner with composition material that could be cut apart to permit separation of sections. For instance, each roof section might be covered with roll roofing to the edge, and only the seams subsequently closed by application of a roofing strip cemented in place. It would be an easy matter to remove this strip and replace it after the cabin had been set up in its new location.

A building idea that could be applied to vacation cabins

CABINS AND RANCH HOUSES

is the use of rammed earth for walls. There are standing today rammed-earth structures of good size that were built years ago. They are practically as durable as if they were made of stone or reinforced concrete.

The process of building a rammed-earth cabin would be about the simplest and cheapest that could be imagined. The building material itself could come from the cabin site. Any type of earth that, when wet, dries into firm mud, can be used. Various clays such as the red clay found in some sections would be excellent. Straw or other binding material is added to the earth to hold it together. Water is added until the mixture is plastic yet very stiff, being moist rather than wet. Wall forms are built of planks, very much as if concrete were to be poured into them. The earth-and-straw mixture is dumped into the forms and tamped firmly into place with a standard iron tamper or a suitably shaped log. This tamping compacts the earth until it becomes dense and firm. This process continues until the wall is built to the desired height. Addition of asphalt emulsion to "stabilize" the earth material has been suggested.

Window and door frames are set in place as the wall rises, so that the earth is packed tightly about them. After the forms are removed, the earthen walls begin a drying-out and setting process that eventually converts them into something resembling stone. Weather and normal wear and tear are not formidable enemies of the rammed-earth house. Conventional roof construction is used with such a building. The rafters rest on wooden plates laid along the tops of sidewalls and fastened to timbers imbedded in the walls and extending down to the ground, the walls being thick enough to permit this. Floor joists are set in place in the usual manner, being fastened to sills running along the base of the wall or imbedded part way in it.

Chapter 10

DOORS, WINDOWS, AND SHUTTERS

ALTHOUGH there is nothing particularly complicated about windows and doors, care should be taken in installing them because it is at such points that rain and snow and cold enter and cause discomfort or damage. It is just as important to have weatherproof windows in the simple cabin as in the costliest mansion.

The simplest window imaginable is one that does not open but consists merely of a sash set permanently into a wall. However, the fact that cabins, lodges, cottages, and bungalows are fundamentally summer-time residences, makes the hinged or sliding sash a necessity. For the log cabin, the window sash can be set into a simple frame made of 2- by 6-in. lumber. The lower cross member of this frame, or the sill, is sloped downward so that water will run off. If the window is to swing outward, the bottom edge of the sash is beveled to correspond to this slope, and a strip of wood, forming a stop, is nailed firmly along the sill inside the sash. Likewise, similar stops are used on the side pieces or jambs and across the top crosspiece or head. The sash can be hinged either at the top or at one of the sides, the latter probably being better because the window glass can be used as a scoop to capture air currents moving parallel to the wall.

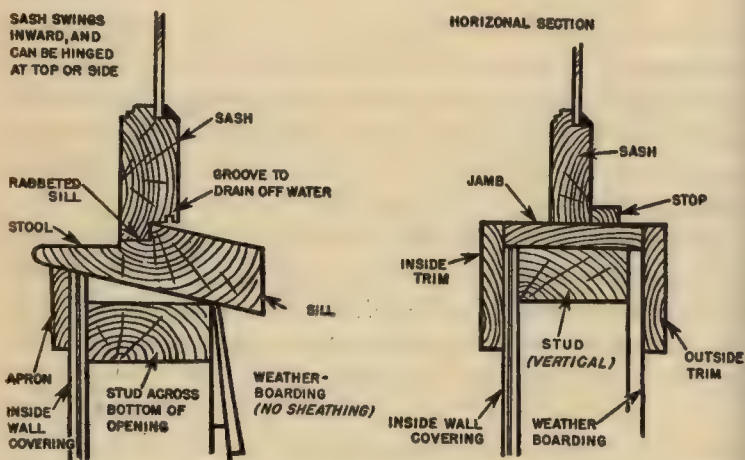
When the sash opens inward, the stops are placed on the outside of it and the bottom edge is not beveled. Instead, the top of the sill, from the front edge of the stop, is planed off so that it is horizontal and not sloping. This permits the

CABINS AND RANCH HOUSES

sash to swing inward without binding. An alternative construction is to rabbet a groove along the sill and let the sash swing in it, a nailed-on stop in this case not being necessary.

For the somewhat more elaborate construction encountered in framed cabins, a single-sash window frame, like that shown in one of the sketches, can be made. The inside upper

SIMPLE WINDOW:



A simple window, with a sash that swings inward. It is suitable for framed buildings.

edge of the sloping sill is rabbeted to fit the sash, which likewise has a rabbeted edge. The stool is integral with the sill and is so low that its upper surface is slightly below the rabbet. This permits the sash to swing inward. The lower edge of the sash, near the outer surface, should have a groove plowed in it to prevent water from creeping back into the rabbet joint. Note that there is some clearance between the sill top and the grooved surface. The window sash may be swung on hinges at the top or one side. The vertical sides of the sash rest against stops that can be nailed-on strips, or ledges formed by rabbeting out the jambs, the lat-

DOORS, WINDOWS, AND SHUTTERS

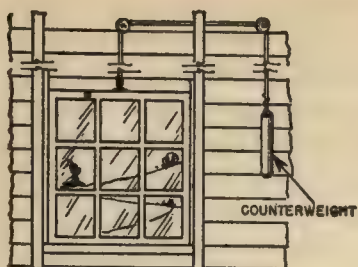
ter method being the better. With this construction, a single-sash window is as storm-proof as more elaborate types.

While the majority of cottages, cabins, and other recreational structures will require casement windows, the type having weighted sliding sashes can be employed in some cases. Window frames for either of these styles should be purchased ready-made. They are cheaper and better than any you could construct. It is a wise plan to obtain the sash before the window openings are framed, so that you will be certain of a good fit.

In order to operate without the aid of a crowbar, a door should be constructed with care from the studding outward. Select the straightest and soundest 2 by 4's out of the lumber shipment and set them aside for use around doors in outside walls and partitions. Double the studs and cross-pieces about door openings. The door swings in a frame made generally from $\frac{7}{8}$ - or 1-in. material. Strips of wood, fastened to the inside surface of the frame, form stops that prevent the door from swinging too far. Sometimes the frame is made of thicker stock and a groove rabbeted out for the door edge, forming a stop.

It is of utmost importance to get the door frame perfectly plumb or nearly so, and to have both sides plumbed to exactly the same degree of accuracy. Then the door will operate without binding. The frame is nailed to the opening in such manner that the outer and inner edges will be flush with the respective wall surfaces if additional trim is to be used. If no trim is to be applied, the frame can project slightly beyond the surfaces. Weatherboarding, shingles, plywood, or other materials used on adjacent surfaces can be butted tightly enough against the frame, if care is taken, to make cracks a rarity. It is better to use interior and exterior trim with doors, but with inexpensive cottages and similar buildings these can be omitted. Such trim consists of 1-in. boards a few inches wide, nailed around the opening in

CABINS AND RANCH HOUSES



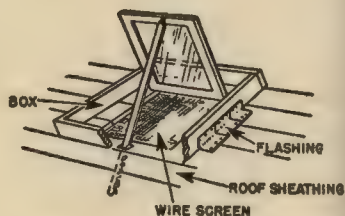
SLASH TO SLIDE VERTICALLY



TWO PAIRS OF SASH IN ONE OPENING

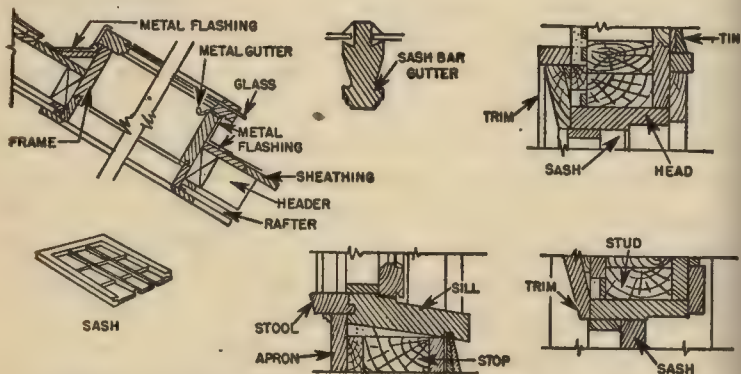


TWO CASEMENT WINDOWS IN DOUBLE FRAME



SIMPLE SKYLIGHT

FRAMING AT A SKYLIGHT



Various ways of building windows and skylights are shown here.

DOORS, WINDOWS, AND SHUTTERS

picture-frame fashion, the crosspiece at the top overlapping the ends of the vertical pieces. There are various ways of arranging the trim, but the simplest is generally the best. Fancy mouldings do little more than catch dirt. For a log cabin, a rugged door frame made from 2-in. material will serve. It can be worked over with an ax or an adz or broad chisel, to make it look like a hewn plank. Hang ordinary doors on standard butt hinges and use standard latches and locks for holding them shut.

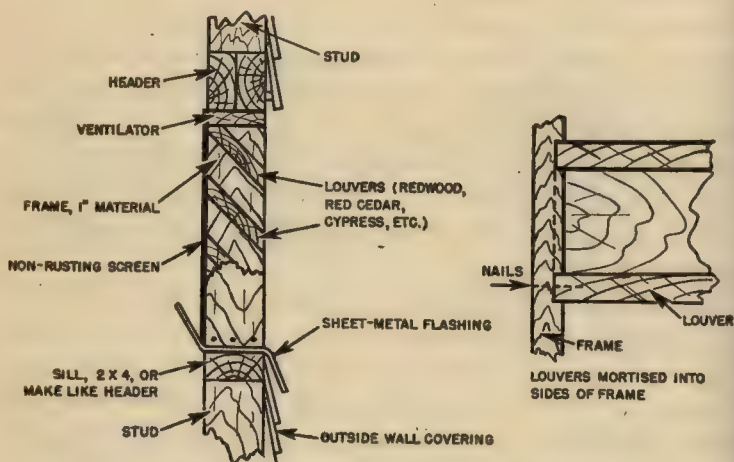
A skylight is a highly useful addition to the summer cabin or cottage. Hot air and cooking odors rise to the top of the room and collect in the pocket formed by the roof and walls. If there is a skylight in the roof, opening it releases these impurities and permits fresh air to enter through ordinary windows and doors. A skylight in the kitchen roof is a source of comfort to the summer cook. Besides improving ventilation, it increases the illumination, a welcome condition in any cabin.

Construction of a skylight is no more difficult than the installation of an ordinary window. In some ways it is simpler. There are several methods of doing the job. One is to cut an opening in the roof somewhat smaller in size than the sash that is to be installed. Then, around this opening, construct a box that extends up from the roof a few inches. The outside dimensions of the box should be about an inch less all around than the outside measurements of the sash. Install metal flashing all around the box, letting it run to the top edges and for several inches each way beneath the roof covering. Hinge the sash to the upper edge of the box in such a way that it projects an inch beyond each side. Along the lower surface of the sash, near the bottom edge, cut a groove to prevent water from creeping back into the joint. If water gets in between the sash and box in sufficient quantity to cause trouble, it generally can be stopped by nailing a strip of sheet copper or painted tinplate about 3 in. wide,

CABINS AND RANCH HOUSES

all around the sash, so that it projects downward in the form of an apron.

Frame around the skylight opening, when the roof is being erected, in the same manner as around ordinary window openings. Make a light frame to fit the opening and cover it with screen-wire, to keep out insects. The sash can be raised and lowered by a notched bar or rod extending downward through the lower part of this frame, to a point where it can be reached from the inside.



Louvered ventilator suitable for gable end of building.

Another way of installing a skylight sash is to mount it flat against the roof and build a box a few inches high around it, installing flashing as before, and providing drain holes along the lower side.

In the winter, and when the cabin is closed, the skylight should be covered with a board that fits either over the sash or the surrounding box, depending on the type of construction. While ordinary glass can be used, it is safer to employ regular skylight glass, or at least the variety that is rein-

DOORS, WINDOWS, AND SHUTTERS

forced by imbedded wire so that a tree limb or stone falling on it will not shatter it.

Another way of releasing hot air trapped beneath the roof is to install ventilators in the gable ends, as close to the roof as possible. These can be small windows that can be opened, or louvered ventilators. Use screens to keep insects out. Ready-made ventilators, screen and all, can be purchased.

It is by straying away from ordinary construction that the builder of a cabin can introduce the interesting details that mark the difference between a charming recreational retreat and an ordinary shack. Among the best places to introduce these little refinements, many of them less costly than ordinary construction, are the doors and windows.

Factory-made doors and window frames and shutters look as out of place in the rustic log cabin as a modernistic chair in an antique shop. You may retort that the constructing of such things is beyond the ability of the average worker in wood. It happens, however, that very interesting doors of the simplest construction imaginable can be made by almost anyone. Also, there are on the market built-up doors, so designed that they will not warp, that are reproductions of rustic doors applicable to log cabins and log-siding houses.

The simplest door consists of the required number of boards placed edge to edge and held together by cleats arranged in the shape of a Z. Although such a door has some inherent faults, such as the possibility of twisting and otherwise changing its shape, careful workmanship can eliminate much of this. An attractive material is knotty pine boards with their edges slightly chamfered or left square. It is an excellent idea to secure boards with tongues and grooves, so that the joints will be water-tight. If the door is to be used in an outside wall, paint the joints with white lead and oil, being careful to wipe off all excess lead that oozes out, if the door is to be left in a natural finish.

CABINS AND RANCH HOUSES

A similar but somewhat more massive door can be made by using log-cabin siding set vertically for the outside, and knotty pine boards on the inside. Joints can be staggered for tightness. When properly done, a door of this construction looks as if it were built of carefully-matched slabs. The Z brace is fastened to the inside surface, or it can be placed between the two panels.

For cottages and cabins not of the log-cabin type, ordinary factory-made doors, with or without glass, are suitable. Usually the doors are made about $\frac{1}{8}$ of an in. larger than their listed widths and lengths, so that there will be sufficient wood for fitting.

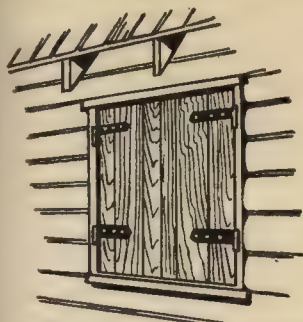
The so-called Dutch door can be worked into the rustic cabin with ease. This door is in two sections, like barn doors you have seen, so that the upper half can be opened while the lower half remains closed. Such doors are excellent for use in kitchens because they can be opened at the top for ventilation. Doors of this type, as well as of the log-siding and knotty pine board construction, can be purchased ready-made.

For cupboard doors, nothing is simpler to use than plywood $\frac{5}{8}$ to $\frac{3}{4}$ in. thick. This material, made up of five plies of veneer, can be cut out and hung without frames, the edges of the boards being merely planed and sanded smooth. Attractive cupboard and closet doors can be made also of knotty pine, redwood, cypress, cedar, and other suitable woods; or they can be constructed of ordinary flooring or ceiling when appearance is not of prime importance.

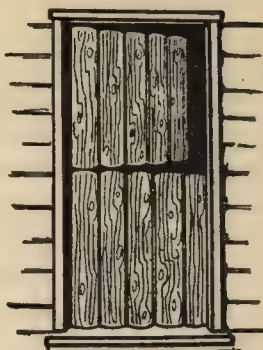
To keep out intruders and the weather when the cabin is not used, durable shutters are desirable for all windows. These can consist, for the rustic cabin, of boards weathered naturally or artificially and hung in pairs that swing outward against the side of the structure. White pine, cypress and redwood are among the materials that are suitable. The surface can be wire-brushed or scorched and brushed, to

DOORS, WINDOWS, AND SHUTTERS

WINDOW AND DOOR CONSTRUCTION, CONTINUED

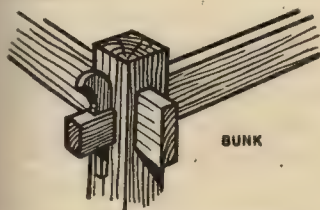


RUSTIC WINDOW SHUTTER MADE OF SAND-BLASTED WOOD, STAINED TO LOOK WEATHERED



"DUTCH" TYPE CABIN DOOR MADE OF LOG SIDING

FURNITURE:



BUNK

CORNER DETAIL OF TAKE-APART BUNK

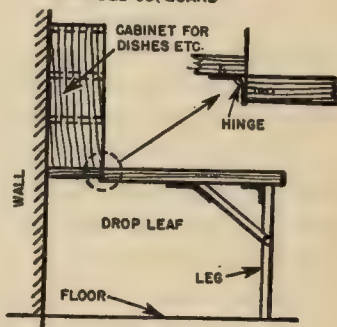
STOOL



17 1/2" HIGH
12" TO 14" DIAMETER

1 1/2" POLES

DROP-TABLE CUPBOARD

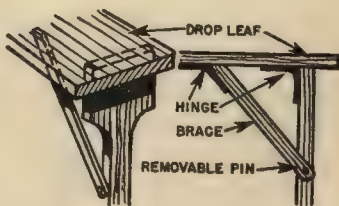


CABINET FOR DISHES ETC.

HINGE

DROP LEAF

LEG



DROP LEAF

HINGE

BRACE

REMOVABLE PIN

Above, left: Solid window shutters give protection when cabin is vacant. Right: The Dutch door is popular because lower half provides security while upper half is open for ventilation. Below: Details of simple furniture anyone can make for cabin or cottage.

CABINS AND RANCH HOUSES

produce a weathered appearance. An attractive shutter is made of log siding arranged either vertically or horizontally. Thus a house covered with log siding can be made to look as if it had no windows at all, simply by closing the shutters. For new shutters that are to simulate weathered ones, the boards are sandblasted and stained so that they look as though they had been aged by long exposure to the elements.

Cabins and cottages finished with shingles or weatherboarding should be equipped with neat shutters painted in some harmonizing color. Thus a white cottage with buff trim and blue shutters and a rich brown roof would be highly attractive. There is an almost endless variety to the treatment that can be given to shutters to make them attractive. Standard batten-type shutters, the kind having horizontal strips set across them so that air can enter but rain cannot, are suitable, but are not as sturdy as when solid boards are used.

Much charm can be added to rustic doors and to shutters of all types by careful choice of hardware. Doors made of log-siding and knotty boards are striking if hung on massive wrought-iron hinges similar to those seen on old-time houses. A wrought-iron latch to match the hinges is imperative. Some kinds of shutters, such as those made of weathered boards, should be hung on similar wrought hinges. The ingenious craftsman can make these hinges himself, either from bar or strap iron or by re-working large barn-door hinges with a ball-peen hammer and file, to give them an antique finish. There are various devices for fastening shutters back against the outside walls. An S-shaped piece of iron, mounted at the end of an iron rod extending the necessary distance from the wall, was used in Colonial times. This might be adapted to many cottage styles. The S-shaped piece can be turned, like a door button, to fasten or unfasten the shutter.

Chapter 11

BUILDING FIREPLACES AND CHIMNEYS

A LOG cabin without a fireplace is as illogical as a rowboat without oars. This applies equally to cabins of real logs or of log siding, and to a lesser degree to other types of construction. As for the less permanent or less pretentious hunting and fishing lodge, lake cottage, or bungalow, cooking and heating equipment frequently involves the installation of safe and efficient smoke pipes, flues, and attendant construction. Many a disastrous fire that interrupted a perfect vacation or week-end recreation period could have been prevented if the builder of the fireplace or chimney had observed some of the simple rules governing such things.

A fireplace in a summer cabin may seem out of place. But there are chilly evenings and damp days to be considered, and nothing is more cheering at such times than an open fire. In winter a good fireplace is an essential part of the cabin. Although from the standpoint of efficiency a fireplace falls far behind various other sources of heat, the fact that the open fire has been a source of safety and comfort to the human race for so many thousands of years gives the fireplace something of the status of an idol or stone god. So if you are planning a cabin, start first with the fireplace, because that probably will be the first thing you will build, along with the foundation piers.

You can build a fireplace and chimney yourself, or hire a mason to do it. Odd as it may seem, not all masons know how to put up a really good fireplace that will not smoke and a chimney that will not leak. If you hire the work done,

plan to stay on the job almost constantly, to see that everything goes as it should. You probably will have long arguments with the mason to convince him that he should install a smoke shelf, or place the throat 8 in. above the top of the fireplace opening, or do something else that good design calls for. If you do the job yourself, observe the few rules for proper construction that are given in this chapter, and you will have little trouble.

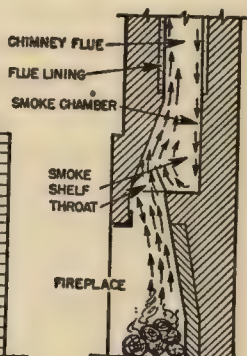
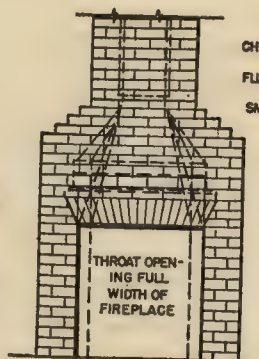
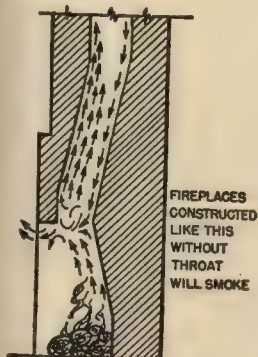
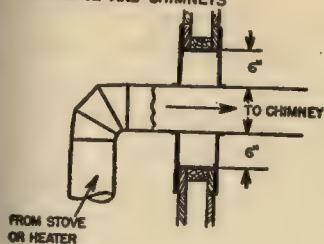
The best material for the cabin chimney and fireplace is local stone. Large boulders can be broken to reveal their inner beauties and to make them convenient to handle. Brick can be at home in the woods or other rustic setting. Reinforced concrete can be used if the outside is properly textured and perhaps colored; but a concrete fireplace or outside chimney lacks much of the natural charm of one built of stone.

From the standpoint of appearance, an outside chimney rising from one end of the cabin is desirable. It can be reached easily if repair work becomes necessary in later years. On the other hand an outside chimney is wasteful of heat and cannot conveniently be made to serve kitchen stoves and other heating devices. So the matter of location becomes one largely of personal choice. Since your goal is not primarily an efficient heating system but rather one that radiates good cheer and a certain "atmosphere," the outside chimney probably will win the most votes. Some builders construct outside barbecue fireplaces at the bases of massive chimneys, and find them sources of much pleasure.

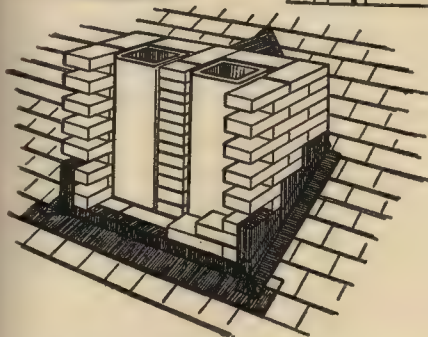
Wherever the location, the chimney must be provided with a substantial foundation. Never support a chimney and fireplace on the wooden framework of a building or on anything else less secure than the earth itself. Construct a solid footing in a manner similar to that employed for concrete or stone piers. That is, dig a hole a foot or so larger all around than the base of the chimney, fireplace, and

BUILDING FIREPLACES AND CHIMNEYS

FIREPLACE AND CHIMNEYS



PROPER CONSTRUCTION



Above, left: Running stove pipe through metal thimble in wall. Right: Nearby trees, etc., may affect chimney draw. Center: Wrong and right way to construct fireplace. Below: Brick chimney showing flue linings.

CABINS AND RANCH HOUSES

hearth combined, extending it well below the frost line, and then make a footing of reinforced concrete or stone masonry. Take pains with the footing, for it must support a great weight. An insecure chimney will settle and perhaps sway in the wind, causing damage to the rest of the structure. It generally is the best plan to build the fireplace and chimney first, and to erect the cabin about it.

The chimney-and-fireplace combination consists essentially of four parts—the fireplace itself, the throat, smoke chamber, and flue. The shape, construction, and relative dimensions of each of these parts are important.

Determining the size of the fireplace is regulated somewhat by the size and shape of the room. Some builders make the overall width equal to about one-third the longest dimension of the room. Others follow the plan of using a size that merely looks right. The opening should be wider than it is high, or at least square. Never make it higher than wide. A fireplace whose opening is less than 30 in. high is difficult to tend, so that this figure can be taken as a minimum, with the maximum about 40 in. for fireplace openings less than 6 ft. across. The lower opening is less likely to let smoke escape into the room. Other factors determining the fireplace size include the type of fuel to be used. Half-length cord-wood requires an opening at last $2\frac{1}{2}$ ft. wide, while if large logs are to be burned the width should be 6 ft. and the depth nearly 30 in. Depth of any fireplace should be 18 in. or more.

While a fireplace hearth may be of solid construction, it is convenient to build an iron grate or ash-dumping device into it at the back, and make a chamber below it into which the ashes fall. When there is no cellar beneath the cabin, the ashes can be removed through an opening built into the outside wall of the chimney and equipped with a tight-fitting iron door. It is best to keep the hearth level with the floor throughout, so that refuse can be swept into it. Some build-

BUILDING FIREPLACES AND CHIMNEYS

ers follow the plan of elevating the hearth a few inches in the fireplace opening, pointing out that less stooping is required when adding fuel or removing ashes, and that a somewhat better distribution of heat is obtained. Sometimes the hearth curves upward 2 in. or so at the front edge of the fireplace opening, to form an ash pocket. The hearth can be of flat stone or concrete, made as smooth as possible to facilitate tending.

A stone fireplace should be rugged and massive in construction. The distance from the side of the opening to the outer corner of the jamb should be in the proportion of about 16 in. for every 30 in. of opening width. The mantel above the opening can be built as an integral part of the fireplace, with flat stones; or it can be a hewn or split log supported on pegs set in the masonry. Stone chimneys and fireplaces should be at least 1 ft. thick.

Supporting the mass of masonry above the opening is a matter demanding care. When the fireplace is of massive construction, having jambs substantial enough to resist a considerable lateral thrust, an upward-curving arch can be used. Generally, however, a heavy iron beam, preferably of T-shape in cross section, is set above the opening to support the weight. This beam should be sufficiently large to prevent sagging when it becomes hot. The T is placed in an inverted position. Some forms of dampers are built as an integral part of a supporting bar.

The U. S. Department of Agriculture has made a study of proper fireplace construction. Many of the recommendations in this chapter are based on the results of that study. One important point that is stressed is proper shape and construction of the fireplace opening.

A fireplace opening can be compared somewhat to a reflector on an automobile headlamp or other source of more or less concentrated light. In the fireplace, heat waves must be reflected by the back and sides of the fireplace into the

room. This is the only possible way that a fireplace can heat a room, other than by direct radiation from the fire itself. A conventional fireplace does not circulate heated air as a furnace or stove does. On the contrary, it sucks in cold air, sometimes to the discomfort of occupants of the building, and sends it, together with hot gases, up the flue. (There are, however, "heat-circulating" fireplaces built around hollow metal shells having cold-air inlets near the floor and warm-air outlets at the top.)

So slope the back of your fireplace forward, beginning the slope about one third the distance from the hearth; and build the sides so that they are straight vertically but angle inward from front to back. Thus the opening is widest at the front, and deepest at the hearth and for a distance upward of about one third the height. Line the sides and back with firebrick laid flat, with their longer edges showing.

By sloping the back surface of the fireplace forward, the opening leading into the smoke chamber and flue is restricted in width. The recommended width for this opening or throat is 4 to 5 in., preferably the smaller figure. It is important that the narrowest part of this opening or throat be 8 in. above the arch or lintel of the fireplace opening, no matter what the diameter or height of the fireplace. Some builders place the throat even with the top edge of the opening, and have a smoky fireplace as a result. It is equally important that the throat extend the full width of the fireplace. Do not start narrowing in the top of the fireplace until after the throat has been reached.

Although a fireplace without a damper will work well if otherwise properly designed, a damper is a highly desirable piece of equipment. Besides providing control over the behavior of the fire by regulating the draft, a damper can be closed when the fireplace is not in use, to keep mosquitoes, flies, birds, squirrels, and other pests from entering the room.

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Such fireplace dampers consist of an iron lid hinged at the back of an iron frame that forms the throat. Construction of the throat is simplified because the iron provides a support for the masonry. A handle projects through the front of the fireplace to provide a way of regulating the damper. While the maximum diameter of the throat may be greater than 4 or 5 in., the effective width is regulated by the damper.

Every fireplace should have a smoke shelf and chamber. The shelf is a flat area immediately behind the damper, and extending back until its rear edge is in line with the back of the flue. To understand the necessity for a smoke shelf, it is necessary to observe the action of gas and air currents in a fireplace. Hot gases, sparks, and smoke from the fire rise into the throat of the fireplace because heated air is less dense (lighter) than surrounding cooler air. The narrow throat directs the rising gases along the front surface of the smoke chamber and flue. These gases, in rising, cause downward air currents to flow along the back of the flue. If the chimney is improperly constructed, these downward currents will be directed into the throat in such a way that the upward rush of gases and smoke will be checked, and a smoky fireplace will result.

This condition is prevented by making a shelf back of the damper. The downward air currents then strike the shelf and bound forward, intersecting the upward currents at such an angle that they do not cause interference, but are carried back up the chimney. A damper, by creating an upward-sloping path, helps in properly deflecting these downward currents.

A smoke shelf, therefore, is necessary. Its depth is not governed by the size of the fireplace opening, but only by the relative positions of the flue and throat. It should be over 4 in. deep and should extend the full width of the throat.

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Between the top of the throat and smoke shelf and the bottom of the flue is a space known as the smoke chamber. It is relatively large in volume, extending as it does over the combined width of the smoke shelf and throat, and the length of these parts. The smoke chamber provides a space in which the downward traveling air currents can expand and thus lessen their speed. It also exerts a cushioning action by providing a pocket to hold the smoke temporarily when gusts of wind blow down the chimney. Without a smoke chamber, such gusts would force smoke into the room. The sidewalls of the fireplace can begin tapering in towards the flue when they reach the base of the smoke chamber; but they should be built straight before that. Although the amount of taper can vary, the Department of Agriculture suggests that the walls be drawn inward 1 ft. for every 18 in. This lessens the friction, as compared with steeper slopes. Finish the walls of the smoke chamber with cement mortar applied at least $\frac{1}{2}$ in. thick, and made smooth to reduce friction.

This cement mortar is of the type that should be used for laying up the fireplace and chimney, with the exception of the firebrick. Typical specifications for the mortar are: Mix 9 lbs. of dry hydrated lime with one bag of Portland cement (94 lbs.); then add three times this volume of clean sand and sufficient water to make a smooth-flowing, easily worked paste. Instead of the hydrated lime, $\frac{1}{4}$ cu. ft. of slaked lime putty can be used. The stones should be wet when mortar is applied. Do not use ordinary lime mortar for fireplaces and chimneys.

The flue is the part of the chimney above the smoke chamber. Good construction demands that it be lined with a smooth-surfaced, fire-resisting material. Commercial flue lining is available in various sizes and shapes. It is set in place as the chimney rises, and filled around with cement. The round form is best because it offers less resistance to

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spirally moving gases, and can be cleaned easier. Square or oblong flues can be used, but are less desirable than the round ones. Some fireplace builders have employed old hot-water tanks, with their ends cut off, and placed end to end as flue linings. If a local building code is in effect, its regulations with respect to flues etc. should be followed.

There should be a correct relation between the area of the flue, measured in cross section, and the area of the fireplace opening. A general rule is to make the flue at least one tenth the area of the opening. This is for round flues. When square ones are used, a somewhat larger flue area is required. If you provide 15 or 16 sq. in. of flue area for every square foot of fireplace opening, you will be safe.

The matter of uniform area throughout is desirable. The area of the throat should be no less than the area of the flue; and the flue area should not decrease at any point from the smoke chamber to the chimney cap. If turns must be made, they should be gradual and the cross-sectional area should be maintained. Do not narrow in the flue opening at the chimney top. There is no advantage to this; in fact, there is a decided disadvantage because such construction decreases the effective flue area throughout.

Only the fireplace gases should be permitted to enter the flue. If the chimney is to be used for conducting smoke and gases away from a cook stove, water heater, incinerator, or other device, provide separate flues, and space them at least 4 in. apart with a solid brick or concrete wall between. A flue with more than one opening will not draw well and is hazardous from a fire standpoint.

It is important that the flue linings be installed so that no leaks will develop at the joints. When two flues run side by side, arrange the sections so that one joint is 8 in. or so above or below the corresponding joint in the other flue. To test a flue for leakage, build a fire of leaves, tar paper, or other smoke-producing material in the fireplace, and then

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cover the top of the chimney with a wet blanket or piece of canvas. Any leaks will be made visible by escaping smoke. They should be repaired immediately.

Place the top of the chimney where good draft conditions will prevail. It is not good practice to build a chimney near a large tree. When the wind blows over the chimney and strikes the tree, eddy currents will be set up and force the smoke back down the chimney and into the room. Likewise, a near-by hillside may cause downward drafts. These can be counteracted to some extent by building an arch over the chimney top, so that the smoke emerges at the sides. If possible, place the fireplace and chimney on a side where there are no obstructions. The chimney should be at least 2 ft. higher than the roof peak, if the roof is of gable or similar construction; and 3 ft. if a flat type. The higher the chimney, the better the draft. Some chimney experts claim that a chimney should be at least 40 ft. high; but a log cabin with a 40-ft. chimney probably would look more like a misplaced factory.

Whether the chimney is used with a fireplace or other heating equipment, or whether it is of brick, stone, or reinforced concrete, there are various rules of safety that apply. The chimney should be well made, with all joints cemented well, particularly the vertical ones. It should rest on a solid foundation. Wood should not be built into the chimney or come in contact with the outside surface, unless properly insulated. The leaving of a 2-in. space all around a chimney that extends up through a wood structure is advisable. The intervening space can be packed with cinders or other non-rigid, non-burning material that acts as an insulator. At the point where the chimney passes through the roof, install copper flashing. Between the chimney and roof frame should be sufficient space to permit the chimney to settle, expand or contract with temperature changes, and perhaps even sway in the wind, without damaging the build-

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ing. The copper flashing takes care of these movements and at the same time keeps out the weather. Upper edges of the flashing can be folded over the bricks or stones and imbedded in the mortar for a short distance. Chimneys that are to be surrounded by wood construction can be coated with a layer of cement plaster, to lessen fire danger.

Smoke pipes from stoves can be a real source of trouble or danger when not properly installed. They must be connected into the chimney tightly, running through a thimble of metal or other suitable material. The end of the pipe should be flush with the inner surface of the flue. If it projects beyond that, gases emerging from the pipe will be obstructed by the opposite flue wall. When it is necessary to run a stove pipe from one room through the partition into another room in order to reach the chimney, adequate protection should be provided for the partition. Some authorities specify a double galvanized iron ventilating thimble at least 12 in. larger than the pipe.

All smoke pipes and flues should be cleaned at least once a year. The occasionally-used cabin chimney will become filled with soot, tree limbs, leaves, and even birds' nests during the periods of idleness. An easy way to clean a fireplace flue is to drop a rope down from the top, tie a bag of leaves or straw on it, and pull the bag up through the flue. A round flue is easier to clean by this method than a square one.

In some large mountain lodges a type of fireplace that is more efficient than the ordinary variety is employed. It is in the center of the room, so that heat radiates from all sides. Smoke is conducted outward by a chimney placed directly above it, and flaring out at the bottom. This cone can be made of metal or masonry, and is supported at the corners by pillars rising from the fireplace hearth. A metal smoke cone probably could be suspended on steel rods, if the roof is sufficiently massive to permit this. Some difficulty might

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be encountered in building a fireplace of this type so that it will not smoke. But by observing the methods employed for ordinary fireplaces—proper arrangement of the throat, smoke shelf, and smoke chamber—a good job probably can be done. A fireplace open on four sides would be just as heavy as the ordinary type if built of stone masonry; so it would be necessary to provide massive corner pillars to support the chimney, and to make the lintels above the openings sufficiently strong.

But whatever the type of stone fireplace you use, refrain from varnishing the rocks or painting the mortar or otherwise trying to improve on nature. You can, if you wish, plant moss and even small flowering plants in the cracks between stones if they are deep enough; but avoid disturbing the general scheme of things by introducing something that causes discord with the rustic note.

Chapter 12

PLYWOOD FOR YOUR CABIN

BECAUSE of its strength, uniformity, ease of handling, and other characteristics, plywood has come into considerable popularity as a modern building material. It seems at home in the woodland cabin as much as in the latest ranch-house home.

Plywood is made by gluing together relatively thin wood veneers so that the grain of each ply runs at right angles to the grain of the ply or plies in contact with it. When waterproof adhesive is used, the plywood is suitable for exterior locations.

Douglas fir plywood is made in various grades and types. The surface veneers used may be of highest-quality appearance suitable for painting or natural wood finishes. Surface veneers of somewhat lower appearance value are intended for installations that are not exposed to view. A plywood panel may have both surfaces finish-sanded and free of flaws. For paneling interior walls, one surface should be suitable either for paint, light stain or other finish. For sheathing and subflooring, neither surface need be of good appearance or even smooth. The plywoods having one or both surfaces of highest appearance quality are, of course, the most costly.

Plywoods come in numerous thicknesses such as $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1 and 1- $\frac{1}{8}$ in. The $\frac{1}{4}$ -in. size is probably the most widely used. There are numerous panel sizes, but 4 by 8 ft. is the standard size in the type of plywood the average cabin builder will be using. Various woods, ranging from expensive imported kinds to relatively cheap domestic fir etc.,

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are used. A costly wood such as mahogany usually appears on only one surface, the back ply being of some less expensive wood or a cabinet wood of low appearance grade. For use in a vacation cabin or similar building, the least costly kinds of plywood usually will suffice. Douglas fir is widely used. The introduction of striated and other special-surface plywoods has offered new possibilities to the cabin builder without greatly altering cost.

Whenever you are applying a piece of plywood to a wall or otherwise using it where one surface is to be important from the standpoint of appearance, inspect the sheet carefully to make sure you have the "right" surface out. If both surfaces are of the same kind of wood, it may be that one has a good appearance while the other shows knots, obvious repair plugs, cracks, rough spots, and poor grain pattern.

EXTERIOR USES

Plywood bonded with waterproof adhesive can be used for outdoor furniture, soffits, siding, gable ends, roadside stands, and other purposes where it will be exposed to weather. So-called marine plywood is exterior type so named because it is suitable for boats etc. For outdoor furniture and similar service, plywood finished smooth on both sides is standard. For weatherboarding or siding etc., only one surface need be finished smooth: for sheathing and subflooring, neither surface.

Outside Walls: There are dozens of ways of utilizing exterior plywood to produce pleasing walls or wall coverings, fences, wind breaks, and so on. Simplest perhaps, and adequate for a vacation cabin, is to use standard full-size panels, such as 4 by 8 ft., directly over a framework of 2 by 4's. Butt the joints as tightly as possible and cover them with battens which may be strips of $\frac{1}{4}$ -in. or thicker exterior plywood 2 to 4 in. wide. For maximum strength, the

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plywood panels can be fastened to the studs and other frame members by gluing and nailing. Use a water-resistant or waterproof type of glue such as the synthetic resin or resorcinol types; and galvanized or other non-corroding 6-penny common nails for panel thicknesses to $\frac{3}{8}$ in., 8-penny for thicker material. Space nails about 1 ft. apart across the panels, 6 in. apart along edges. Gluing is optional, but besides increasing structural strength, it renders joints more weather-resistant. Joints not glued should be waterproofed with a white-lead paste or other sealer.

By using relatively thin ($\frac{1}{4}$ -in. or $\frac{3}{8}$ -in.) panels applied directly to the framework, a strong summer cabin can be constructed at relatively low cost. Interior walls can be left unfinished or covered with $\frac{1}{4}$ -in. interior-grade plywood. If the panels, both interior and exterior, are glued to the studs, a very strong wall results.

Instead of using battens, there are other attractive ways of making outside-wall joints weather-tight. Horizontal edges can be rabbeted to produce a shiplap joint or to fit a shiplap molding, the lower edge of each piece can be rabbeted to fit a wood watertable strip, or a "double-L" shaped metal strip can be inserted between panel edges to act somewhat like flashing. Large-area panels can be broken up by molding strips nailed over them parallel to vertical joints to give a board-and-batten appearance (some of the strips actually being joint battens), or horizontally to simulate siding. The horizontal treatment makes a building look lower and longer or wider.

Exterior type plywood such as Plyshield often is cut into long strips which are applied exactly like wide siding boards or somewhat like shingles or shakes. Thus, $\frac{3}{8}$ -in. plywood siding 12 to 24 in. wide, lapped 2 in., produces an attractive wall. The first course is set out from the frame or sheathing by a furring strip, and each subsequent course overlaps the course directly below it. For exaggerated shadow lines, fur-

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ring strips can be placed beneath every lower edge. Ends of the siding pieces are butted, and beneath each joint a 2-in.-wide wedge-shaped piece of shingle or other wood and a strip of tar or asphalt paper are placed (the paper being between siding and wedge). Effects resembling that produced by shingles are obtained by using striated siding such as Weldtex, which comes in panels measuring $15\frac{7}{8}$ by 48 in. Some builders recommend a bevel of at least 30° upward to provide a drip at the outer edge of each piece used in lap siding.

On ranch houses and similar structures, plywood is often used to produce a variety of exterior finishes on the same building. Thus, part may be of horizontal-siding design, part vertical board-and-batten.

Plywood siding and other exterior surfaces generally are finished by painting in the conventional manner, a paint that does not become brittle being desirable. In some cases, to produce natural-wood effects, a stain and varnish finish has been used on fir plywood in outdoor applications, but its performance is not generally satisfactory. The plywood tends to check, crack, or take on a weathered appearance although the actual strength and durability of the material is not affected. If a stain-varnish finish is desired, weathering of the material should be expected. All edges and joints should be sealed with a heavy coat of exterior house paint, exterior aluminum house paint, or a mixture of white lead paste, raw linseed oil, and drier. Paste type caulking compounds tend to dry out and are not considered as desirable for edge sealing as are paint applications. In locations where there is considerable dampness, backs of panels can be sealed with a coat of lead-and-oil paint or aluminum paint.

Sheathing and Subflooring: A grade of plywood is made for subflooring, roof decking, and roof and wall sheathing. Typical of this material is Plyscord, the structural grade of

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Douglas fir plywood. It is unsanded, has an interior-type glue bond, and comes in thicknesses ranging from $\frac{5}{16}$ to $\frac{5}{8}$ in. A similar sheathing material having an exterior-type bond is available in similar thicknesses. Often plywood is used for making concrete foundation forms, then is cleaned and used for subflooring or sheathing.

Plywood wall sheathing on studs set on 16-in. centers should be $\frac{5}{16}$ in. minimum thickness. It can be fastened to the framework, preferably with the outside grain running at right-angles to the studs, by nailing and gluing, for maximum strength; or it can be nailed without gluing. Six-penny common nails are used for thicknesses of $\frac{1}{2}$ -in. or less; 8-penny for greater thicknesses.

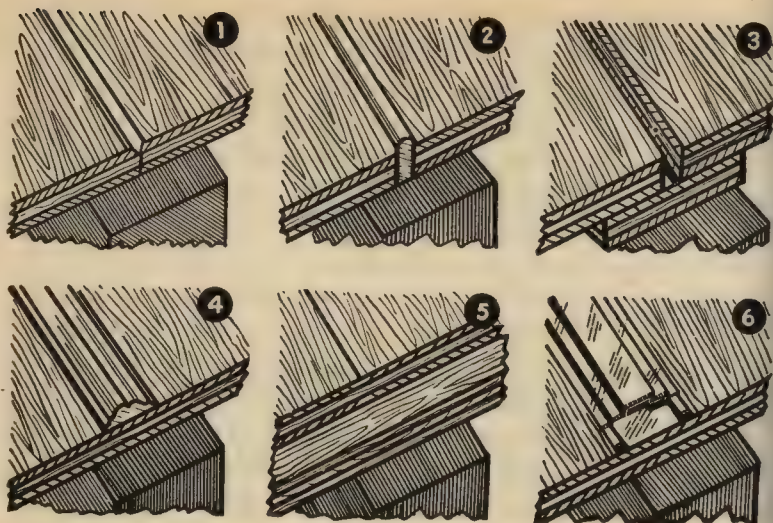
When plywood siding is used over plywood sheathing, the siding may be $\frac{1}{4}$ in. thick although the manufacturers recommend a $\frac{3}{8}$ -in. thickness. Ordinary siding, shingles, or shakes can be applied; but when using shingles and shakes over $\frac{5}{16}$ -in. sheathing, it is recommended that they be fastened with barbed-ring nails for greater holding power.

In areas where there is considerable snowfall or where the roof otherwise must support a heavy load, roof sheathing should be sufficiently strong. The Douglas Fir Plywood Association suggests $\frac{3}{8}$ -in. plywood on rafters spaced 16 in. apart where a roof load of 40 lb. per sq. ft. is to be encountered. For a wider rafter spacing, thicker plywood is recommended, such as $\frac{5}{8}$ -in. for 24-in. rafter spacing, at the same load.

PLYWOOD INDOORS

Plywood subflooring $\frac{5}{8}$ in. thick is quickly laid because of the large size and uniformity of the panels that can be handled. Of course, the joists should be level throughout. Run face grain of the plywood at right-angles to the joists. Use 8-penny common nails spaced 6 in. along edges, 10 to

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Interior plywood paneling can be assembled with various kinds of joints, some of which are shown. 1—Simple "V" joint produced by beveling exposed edges to an angle of about 45° and depth of face ply. 2—Rounded joint produced by separating panel edges to produce a "bullnosed" joint. 3—Recessed joint produced by separating panel edges and placing plywood backing or furring strip as shown. 4—Somewhat in the manner of board-and-batten construction, a decorative wood molding is used to cover a butt joint. 5—When plywood is used as a backing for any material, simple butt joint is adequate. 6—Butt joint covered by snap-on metal molding.

12 in. elsewhere. When plywood is used as underlayment over subfloor and under carpet or linoleum etc., $\frac{3}{8}$ -in. Plypanel usually is specified. (Most fir plywood is either sanded on both sides or left unsanded. Plypanel makes a smooth, solid base for finish flooring.) For economy, $\frac{1}{2}$ -in. subflooring and $\frac{1}{4}$ -in. underlayment is adequate. For cabins, a single thickness of $\frac{5}{8}$ -in. Plypanel will serve as combination subfloor and underlayment or as a finished floor. Rigidity depends on joist spacing. Also, rigidity is improved by joist bridging (X-shaped braces installed between joists).

There seems to be practically no limit to the use of plywood in interior finishing. It may be placed as large panels,

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such as 4 by 8 ft.; as small squares worked into an attractive pattern, as vertical or horizontal planking, and so on. In new construction, the paneling can be applied directly to the framework if the studs etc. are solid, straight, and even. Otherwise, furring strips such as 1 x 2-in. boards or 2-in.-wide strips of plywood are first nailed over the framing, the same as over an old wall.

For vacation cabins and similar walls, a material such as Weldwood paneling or fir Plypanel in the $\frac{1}{4}$ -in. thickness is adequate, although a $\frac{3}{8}$ -in. panel material is better where cost is not important. For nailing $\frac{1}{4}$ -in. fir paneling, 4-penny casing or finishing nails are suggested by plywood makers; for $\frac{3}{8}$ -in. paneling, use 6-penny nails. Space them about 6 in. along edges, 12 in. elsewhere. For maximum strength, glue is applied to studs or furring strips before nailing the panels in place: and glue can be used between furring strips and frame.

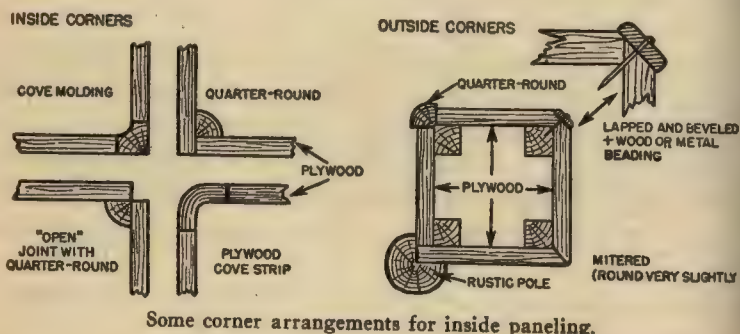
When fitting plywood panels to a wall, be sure that the first one you install is plumb. Where the panel meets a wall corner that is not straight, use a compass to mark the plywood near the edge so the panel can be cut to match the wall contour. Set the compass so its point and pencil are about 2 in. apart, arrange the panel so it is about $1\frac{1}{2}$ in. from the wall against which its edge will butt (being sure the other panel edge is plumb), and draw the compass down the corner so the point rides along the wall and the pencil makes a mark on the wood. Use this mark as a sawing guide. In the same manner, fit panels along ceiling, window and door frames, etc. Cut wall panels so about $\frac{1}{4}$ in. of space will be between their lower edges and the floor, and use a wedge device for pushing the panel tightly against the ceiling while it is being nailed. If you use glue, brush it on the frame members just before placing the panel.

Various joints can be used between panels and at inside and outside corners. Some of these are illustrated.

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Along the bottom of wall paneling, some sort of base-board arrangement is used. The simplest and easiest is a strip of lumber or plywood applied flat against the wall like a conventional baseboard. Such strips are usually fairly narrow, say around 3 in. At the ceiling, any open joints can be covered by a neat molding, stock quarter-round, and so on.

In erecting large ceiling panels, a T-shaped brace is often used for temporarily holding them in nailing position. Its



Some corner arrangements for inside paneling.

lower end is rested either on the floor or on a work platform, and the length of the vertical part is 1 in. or so greater than the distance from ceiling to floor or platform.

When a vapor barrier is used in an outside wall covered with plywood, place it against the warmer wall surface, which usually is the inside one. Asphalt or aluminum paint on the backs of inside-wall panels makes an acceptable barrier, according to plywood manufacturers. Use two coats.

Partitions: Light partitions that support little or no load can be made by nailing $\frac{1}{4}$ -in. plywood paneling to vertical or horizontal strips of 1-in. lumber. Other constructions include plywood $\frac{1}{4}$ or $\frac{3}{8}$ in. thick nailed to 2 x 2-in. studs, and similar panels nailed to standard 2 x 4-in. studs placed so wider surfaces are against panels.

Finishing: Plywood walls can be finished in numerous

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ways, but one of the most popular is the light stain glaze finish which subdues the grain contrast but retains the natural beauty of the wood. This is applied by first whitening the panel with a coat of thin white undercoat and wiping or drybrushing to the desired grain show-through. This is sanded when dry, and followed by a coat of shellac or clear resin sealer, which also should be sanded after drying. One tinted coat of interior undercoat or enamel is then applied and wiped or drybrushed to the desired grain show-through, sanded lightly when dry, and then the surface is varnished. For best effects, the varnish should be rubbed with fine steel wool after it is thoroughly dry.

Two coats of thinned shellac followed by a coat or two of wax makes an attractive and easily-cleaned wall. The wood can, of course, be stained as desired, before shellac is applied. Other transparent finishing materials such as Satinlac can be used instead of shellac, in the same general manner. There are finishing preparations that combine sealer, stain, and wax in one solution.

Some kinds of interior plywood come prefinished. An example is Plankweld, which consists of $\frac{1}{4}$ -in. plywood "planks" 16 in. wide and 8 ft. long, with both long edges grooved. After the first board edge has been nailed, the second edge of the same board is fastened by metal clips that enter the groove and which are secured to the wall by nailing. After clips are in position, the next board is placed so its groove engages the grooves in the clipped edge of the first board. Then the second edge of the second board is clipped . . . and so on.

Plywood is a popular material for built-in conveniences such as book shelves, storage walls, and wardrobes because it is uniform and easily handled. For the same reasons, it is widely used for home-made or custom-built furniture. Douglas fir plywood is suitable for such purposes, especially for concealed parts and those that are to be painted. The nat-

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ural grain of this wood is attractive, but when too prominent it can be given a grain-subduing finish such as that just described for walls. When a particular grain pattern or color is desired, plywood having a knotty-pine, oak, mahogany, walnut, or similar surface is used for exposed parts. Striated finishes and those which emphasize grain (as sandblasted wood) may be appropriate for such parts as cabinet doors.

The thickness of plywood to use is determined often by the design and appearance of the furniture or other unit, and by the weight to be supported (as for a shelf). Doors and shelves of kitchen cabinets, bookcases, and so on are generally of $\frac{3}{4}$ -in. plywood although $\frac{5}{8}$ - and $\frac{1}{2}$ -in. are often satisfactory. When $\frac{3}{4}$ -in. is used for cabinets and similar pieces, sufficient strength can be developed without framework. When a frame is used, $\frac{1}{4}$ -in. plywood is sufficient for most cabinet ends, backs, etc. Most standard cabinet hardware is made for $\frac{3}{4}$ -in. thicknesses of wood.

For a workmanlike job, plywood projects should be sanded until there are no rough surfaces or sharp or splintery edges or corners. Exposed edges that show openings or core gaps can be sealed by a commercial crack filler or ordinary paste wood filler. After the filler is dry, sand the edge, then apply final finish. Glue, shellac, or lacquer can be used to reduce the tendency of an edge to splinter.

Plywood having sandblasted, wire-brushed, striated, or other "three-dimensional" finish can be used to produce interesting effects in walls, snack bars, cabinets, furniture pieces, and almost any other project. Some of these special finishes blend well with a rustic cabin atmosphere.

Fir and other soft woods having grain composed of hard and soft areas may give the novice trouble in painting. A pre-sealer is often used to prevent the more open wood from soaking up paint. Shellac can also be employed.

Chapter 13

A FEW FURNISHING IDEAS

DO NOT make the mistake of building a cabin and then filling it with cast-off furniture from home. So many cabin owners do this, and then wonder why they do not enjoy their vacations, or why guests fail to exhibit enthusiasm about their woodland retreat. The cabin should be furnished in a manner that is entirely in harmony with the vacation spirit.

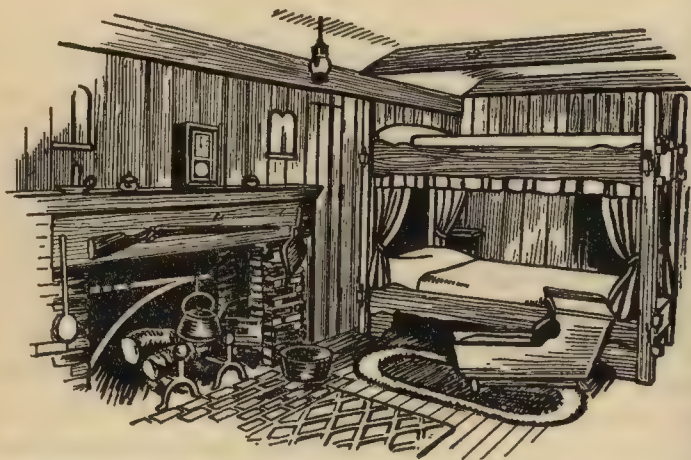
There are two general ideas that can be carried out when furnishing a cabin. One is to design and build furniture that is truly rustic, and possesses nothing of a gaudy or showy nature. Such equipment will be pleasing because it harmonizes with the cabin itself. The other viewpoint is based on the theory that a cabin is essentially lacking in color and other gay features, and that the furniture therefore can be used to liven up the scene—without, of course, showing bad taste. A good plan is to compromise by using rustic pioneer-type furniture and giving the drapes and rugs and cushions the task of introducing color relief.

If you do nothing else during the happy days at your cabin, you will sleep and eat. Therefore bunks and tables and kitchen equipment should be considered from the very beginning. When you plan the cabin, provide ample space for bunks and meal-preparing facilities.

A bunk is a semi-civilized bed. If you are wise, you will insist that it be comfortable, and contain such up-to-date features as a good mattress and springs. Medical experts claim that a good night's sleep is of vital importance to good health. In some cabins, the bunks or beds are made so that

CABINS AND RANCH HOUSES

they can be folded into or against the wall, to provide more space. However, the value of such an arrangement is doubtful, for there is nothing more convenient than a bed for cat-napping, reading, and otherwise taking it easy during the day. It is difficult to imagine how the space that a bed oc-



A pine-paneled finish gives the interior of this cabin an attractive appearance. (Courtesy, Shevlin Pine Sales Co.)

cupies at night can be used during the day to better advantage than as a general lounging place. So make your bunks solid and permanent.

Bunks can be built-in or separate, movable units. It is largely a matter of personal taste. In either case, it is a good plan to procure the springs first, and then construct the bunk about them. This may not be a scientific way, but for the person who is not familiar with bed construction it is a satisfactory method. For a built-in bunk, you can construct a simple framework of almost any kind of wood, just so it is strong enough, and make it an integral part of the wall. The frame can be nothing more than a box made of 1-in.

A FEW FURNISHING IDEAS

lumber, large enough inside to accommodate the springs, and high enough to let you get into or out of bed conveniently. Across the boxlike frame place several wooden strips or slats, on which to lay the springs. See that these are level and well fastened.



Details of a handsome cabin interior which harmonize with forest surroundings. Note "Z" bracing of door. (Courtesy, Shewlin Pine Sales Co.)

For a movable bunk, four corner posts measuring 3 or 4 in. square, and side- and end-pieces cut out of 1-in. lumber will do. Cross slats support springs and add rigidity. The side- and end-pieces can be attached to corner posts in several ways. Mortise and tenon joints produce solid corners.

An ingenious two-deck bunk that can be moved or taken apart and stored can be built by the average craftsman. It requires 4 sturdy corner posts of oak, maple, or other durable wood; 4 side-pieces measuring about 1 by 10 in., and 4 end-pieces measuring about 4 by 4 in., the side- and

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end-pieces being of the proper length to accommodate the springs that will be used. In addition, several slats measuring about 1 by 4 in. will be required, their lengths being determined by the width of the springs.

The corner posts measure about 4 by 4 by 84 in., and should be straight-grained and sound. Oak is an excellent wood to use. With a sharp hatchet go over the pieces until you have produced a hewn surface on them, and rounded all sharp corners. Do the same with the other parts of the bed, and finally remove splinters and rough spots with sandpaper. This texturing can be omitted if desired, but it will add to the appearance of the bunk.

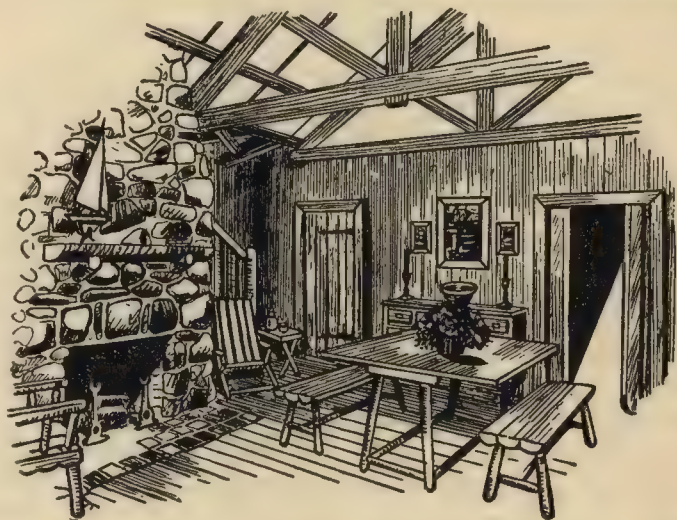
Interlocking mortise and tenon joints, held by wedges, are used at the corners. The construction of such a joint is shown in the sketch (page 111). You will notice that the tenon of the crosspiece passes through a hole in the tenon of the sidepiece, and that the crosspiece has a hole in the projecting end of its tenon, through which a hardwood wedge is driven. Although such a joint may look complicated, it is not difficult to form with nothing more than a chisel and mallet. When such joints are used, the bunk is held together firmly, yet can be taken apart in a few minutes simply by knocking out the wedges and pulling the joints apart. The slats rest on strips screwed to the inside surfaces of the crosspieces, near the bottom. Spacers keep the slats in position. Ends of slats are not fastened.

Simple stools are useful, and can be made by anyone who has a saw, hatchet, and auger. One form of stool consists of a slice about 4 in. thick cut from a 10- to 14-in. log. The flat surface forming the stool top is sanded smooth. In the other surface 3 holes are bored to receive the 3 legs that are cut from poles about $1\frac{1}{2}$ in. in diameter. The legs can be anchored in the holes with glue, nails or $\frac{1}{2}$ -in. wood dowels driven through holes in the sides. Almost any kind of wood can be used. Beech tree limb sections, with the bark left on,

A FEW FURNISHING IDEAS

make attractive legs. The stool top should be shellacked or varnished to make it smoother, unless it is finished with a padded cushion of leather, sheepskin, plastic, or fabric tacked in place. A simple back can be added to make a chair.

Long, rustic benches will prove popular before the fireplace, at the dining table, on the porch, and in fact almost everywhere else in and about a cabin. Simple benches are



You can build your own furniture from rough stock, as shown, and keep it in harmony with the rest of the cabin.

(Courtesy, Shewlin Pine Sales Co.)

constructed like the stool just described, with the exception that the top is a long, wide slab or hewn board. The legs extend all the way through the top, their ends being made flush with the surface. In a similar way, rustic tables can be constructed of slabs or timbers and pole legs. It may be desirable to brace the legs with crosspieces.

Housekeeping in the cabin will be simplified if plenty of cupboards are provided. Everyone knows how to make a simple cupboard. The doors can be constructed in a variety

CABINS AND RANCH HOUSES

of ways. Knotty pine or cedar lend themselves to the making of attractive doors. Another excellent material is knotty-pine plywood. With it, one-piece cupboard fronts can be made. First cut a piece of plywood to cover the entire cupboard, including the doors and frame or frames about them. Then, with a slender scroll saw, carefully cut out the doors. Hinge them to the surrounding frame, and you have a complete and attractive cupboard front. The plywood is rigid enough not to require auxiliary framing or bracing.

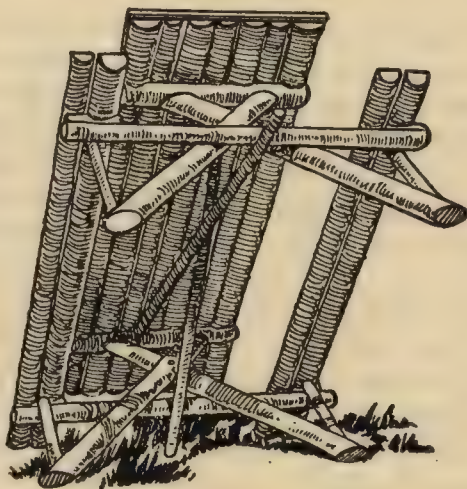
By combining the kitchen table with the cupboard in which dishes and other dining necessities are kept, considerable saving of space is effected. The cupboard itself is conventional, but its door is hinged at the bottom so that, when it is swung downward, it becomes a table. A hinged leg unfolds to support the outer end. This leg can be made non-collapsing by a hinged brace having a hole in the free end through which a pin can be inserted to engage a similar hole in the side of the leg. The leg should be of such length, and the cupboard mounted with its bottom at such height that the distance from floor to table top will be about 30 in. (see page 111).

Another cabin convenience that might be classed as a necessity is a wardrobe. This is essentially a compact clothes closet built of $\frac{3}{8}$ -in. plywood, $\frac{3}{4}$ - or 1-in. knotty pine or other lumber, and placed near the bunks. It is preferable to a built-in closet because it is cheaper and requires less space. The wardrobe is generally divided into upper and lower parts, closed by separate doors. In the lower part, suits and dresses are suspended on hangers. The shorter upper compartment is for hats and similar articles. A drawer or two for linen is desirable. A depth of 24 in. is sufficient for a wardrobe. Women users of the cabin will appreciate a simple dressing table, with drawers and mirror, built either as part of the wardrobe or placed near it.

You can make a rugged lawn table from logs and slabs.

A FEW FURNISHING IDEAS

Short sections of small logs or poles are arranged to form X-shaped supports. Across these are horizontal pieces to support the seats. Braces run from the ends of these horizontal pieces to the lower ends of the crossed legs. The top and seats are constructed of logs or slabs hewn flat on top. However, you may lack the time or inclination to con-



This table, tipped to show its construction, is made of logs that have been hewn flat.

struct your own furniture. You can, then, purchase inexpensive garden and beach furniture almost as cheaply as you could make similar equipment. A few folding deck chairs, a picnic table made of hickory with the bark left on—and much of your furnishing problem is solved. If the cabin is to be closed for parts of the year, it is not a good idea to fill it with costly equipment, for intruders are always to be expected.

Chapter 14

MODERN CONVENIENCES

THE modern vacation retreat is not, like the pioneer cabin after which it may have been patterned, devoid of all conveniences usually associated with present-day living. Although it is desirable to leave traffic uproar, house-to-house canvassers, and corner lunchrooms far behind, some of the more desirable city conveniences can be enjoyed in the backwoods retreat, particularly those that promote safety and good health.

Too little thought, usually, is given to lighting equipment. Because eye injury does not become visible or otherwise apparent like a broken leg or cauliflower ear, the cabin inhabitant may be doing great damage to his vision by employing makeshift lighting. Reading by a feeble oil lamp or candle flame is uncomfortable if not injurious.

One of the most intense sources of light for the cabin that is not near electric power is a gasoline lantern or lamp using mantles similar to those employed for gas lamps. Such light sources are not costly, and are inexpensive to operate. They are sold widely for farm use. Oil lamps employing similar mantles are available, and are preferable to the ordinary type for reading, working, and other activities involving much use of the eyes.

Bottled gas like that sold for operating rural stoves, or acetylene in convenient containers, can be used as a source of light. Special lighting equipment is available for such fuels.

Frequently the cabin will be situated where electric service is available. This is a desirable condition, and one that

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should be taken into consideration when the cabin site is being chosen. Besides providing illumination, electricity will do such things as pump water, operate a radio or television set, and cook meals.

If you wire your cabin without the aid of a licensed electrician, make yourself acquainted beforehand with approved methods of installing cable, outlet and connection boxes, switches, sockets, and the like. The fact that the cabin is rustic in construction and finish is no excuse for being careless with the wiring and perhaps causing a costly fire. Conceal all wiring where it will not be visible. If real-log construction is employed, cables can be run parallel to logs and covered with the chinking material. Make sure that they do not run where they will get wet unless they are weatherproof. Much of the wiring can be placed beneath the floor, and thus kept out of sight. Provide several convenience outlets in each room and on porches for the connecting of lamps, radios, hotplates, etc.

A small generator unit operated by a gasoline engine can provide electricity for a cabin or group of them. Direct-current systems employ batteries for storing current until needed. Alternating-current systems providing, in most cases, 60-cycle current at 120 volts, use no batteries except for starting. The generator runs all the time that current is being used. An a.c. system can be arranged so that the generator starts whenever a switch is turned on, stops whenever there is no longer a demand for current. Such power plants are rated in watts. Typical sizes are 750 to 1,500 watts d.c., and 500 to 3,000 and more watts a.c. Of the a.c. units, the automatic-starting is preferable, although it costs more because it requires a battery and other starting equipment. The size of power plant needed is determined by the total electrical load, in watts, that it must supply. Thus, a 500-watt plant will operate a half-dozen 60-watt lamps and a couple of electric fans at the same time. A 1,500-watt sys-

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tem would operate an electric iron, a refrigerator, toaster, or a well pump, plus a number of 60- or 100-watt lamps. The wattage must be sufficient to *start* motor-driven equipment.

THE WATER SUPPLY

For proper safeguarding of health while you and your friends and relatives are occupying your cabin, there must be a safe water supply and a sanitary method of disposing of waste matter. Because a cottage or cabin usually is situated out of reach of city water and sewerage systems, methods identical with those applicable to farms can be followed.

It is of utmost importance that an adequate supply of *pure* water be available. Water containing disease germs and animal parasites or their eggs may cause such serious diseases as typhoid fever, diarrhea, dysentery, or infections of hookworm, tapeworm, seatworm, eelworm, whipworm and roundworm. It is not enough that the water be clear and sparkling. A single drop of such water may contain enough invisible bacteria to cause sickness and death to a thousand persons.

Whatever the source of water it is a good plan to have it tested by a reliable health authority; and then to have repeat tests made at intervals. Local county or state health organizations will do this work, and tell you how to obtain samples. Usually you will be provided with a sterilized bottle in which to collect and transport the water sample.

There are various ways of disinfecting drinking water. However, such methods are not absolutely reliable, especially when performed by the average person. The presence of dissolved mineral salts may offset the disinfecting action to such an extent that you receive no protection. It is only by making an accurate chemical analysis of the water that disinfecting methods can be applied with certainty; and few cabin owners can do this.

Even so, disinfecting water of doubtful purity is better

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than using it as it is. Among the methods mentioned by the U. S. Department of Agriculture are the following:

1—Boil the water for at least 20 minutes. This is one of the safest methods, but is inconvenient when large quantities are to be treated or when necessary equipment is lacking.

2—Addition of tincture of iodine to the water. Ordinary tincture containing 7 per cent iodine can be obtained at any drug store. Add 1 drop of it to every quart of water (4 drops to the gallon) and let it stand for half an hour before using. There is not enough iodine present to be distasteful or harmful.

3—Use of chlorine tablets sold at drug stores for water purification. Use them according to directions on container.

4—Chloride of lime treatment. Dissolve 1 teaspoonful of chloride of lime, sometimes called bleaching powder, in a quart of water. This forms a stock solution that is kept in stoppered bottles marked "Poison." Add 1 teaspoonful of this stock solution to every 2 gallons of water and mix thoroughly. At the end of 30 minutes the water can be used for drinking or cooking purposes. The stock solution loses strength slowly, and must be made up fresh at intervals.

These precautions are not objectionably difficult when the cabin is to be occupied for a few days at a time and a large quantity of drinking water is not necessary. By having the water tested by a health department or chemist, you can determine the effectiveness of the disinfecting process, or procure advice on what method to follow.

Wells and springs are the common sources of water for cabin and camp use. Every precaution should be taken to safeguard these supplies. Open springs are dangerous because the water can become polluted with dust, rain, insects, small animals, and decaying animal and vegetable matter. The springs should be walled and covered, and the water taken out through a pipe. One way is to curb the spring by constructing a rectangular concrete box with walls 5 in.

CABINS AND RANCH HOUSES

thick, and extending for several feet into the ground where it rests on a loose stone or brick footing. The top is covered by a tight-fitting reinforced concrete lid. Another satisfactory curbing is made by burying two or more lengths of large clay or concrete pipe in the spring. The two upper pipe sections should have T branches in them so that an overflow pipe can be connected to the upper one, and the delivery pipe to the second section. It is best to place the intake end of any delivery pipe some distance below the normal spring surface, and to provide an overflow pipe at the surface.

Wells are of two general types, dug and drilled or driven. Size of a dug well depends on various things such as amount of water required, rate at which it is removed from the well, and speed at which water will enter the hole. A well can be dug with the aid of a block and tackle supported on a tripod tower made from three poles or small logs. One man digs the dirt and loads it into a bucket, which is hauled to the surface by the other man, using the block and tackle. In some soils it is possible to use a centrifugal pump or clam-shell bucket for removing dirt. When wet, unstable soil is encountered, this method can be used, in conjunction with a wood or metal casing that is forced down as the excavation deepens.

Dug wells should be curbed and fitted with a tight concrete capping equipped with a manhole. An efficient curbing is made from large concrete or vitrified sewer pipe, placed with the socket ends uppermost, the joints being cemented securely. At the lower end of the casing, fill about the pipe with stone or gravel, followed by sand. A concrete or clay fill is desirable around the three upper sections.

The concrete platform is to keep out insects, animals, and surface water. This platform is several inches thick, and cemented firmly to the curbing. It is higher in the center and slopes towards the edges, for quick drainage. The pump pipe and cylinder enter the well through a hole near one

MODERN CONVENIENCES

side of the circular area directly above the curbing. Bolt the pump securely to the platform, using a gasket for making a tight joint. The bolts can be anchored to the concrete by expansion devices inserted in drilled holes. A better way is to embed the bolts in the concrete when the platform is cast. Ordinary bolts with large washers at their heads, buried with the threaded ends projecting, will serve. Beside the pump is a manhole that has a tight-fitting concrete cover. This manhole provides entrance to the well for periodic cleanings.

Before entering a dug well to clean it, lower a lighted candle on a string, or a bird in a cage. If the candle goes out or the bird is overcome, you know that there is no oxygen or that undesirable gases are present, and that the well must be ventilated before it is safe to enter.

Dug wells, when located in safe places and properly walled, are as satisfactory as any. They generally produce softer water than deeper wells, and a greater volume. They are easier to repair if anything goes wrong.

A driven well is merely a pipe forced into the earth until it strikes a water-producing region. Wells can be driven to depths of 50 to 100 ft. by hand, with an ordinary sledge hammer or a weight lifted by means of a pulley and rope and then released. The lower end of the pipe is equipped with a well point that consists of a length of pipe fitted with a spearhead, and penetrated by rows of holes along the sides. These holes are covered on the inside with copper screen, to keep out large particles.

Such well points frequently become clogged, so that the life of the well may not be more than a few years. Open-end wells give less trouble from clogging. As the well is driven, earth enters the open end. This is removed with a sand pump, or washed out by means of water forced into the casing through a smaller pipe. Hand-operated pumps suitable for forcing the water down the pipe are available. It

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frequently is possible to assemble a driving or jetting outfit from odds and ends. Sometimes, when a driven well becomes clogged, it can be freed by washing out with water forced into it through a small pipe. If the pump handle snaps back quickly because of suction, the well probably is clogged. Slow pumping, to permit the fine material to dislodge, sometimes will effect a cure.

The location of a well is of utmost importance. It should never be placed where pollution from outside privies, garbage pits, surface streams, drainage ditches, or other sources of filth can drain into it. As a general rule, the well should be at least 100 ft. from such places, and never lower than they. A well placed on ground higher than any of the other camp facilities may be a bit more difficult to pump and require more material to reach the water level, but it is less likely to become polluted. However, the contour of the surface is not a reliable gage, for it is the underground rock and soil strata that determine the flow of surface water that percolates down to them.

In addition to keeping the well away from possible sources of pollution, provide a tight-fitting casing and platform, and keep the ground about it clean. If the water level in the well remains higher than septic tanks and other pollution centers, it is not likely that the well water will be affected. However, in times of drouth or extremely heavy rainfall, the normal water level may fluctuate in such a manner that pollution will flow into the well. The safest plan is to have the water tested at reasonable intervals, after having the well location and surroundings inspected and approved by a local health authority. This may sound like a lot of red tape, but it is nothing compared with the trouble that you would be subjected to by a single case of typhoid fever.

Running water is just as welcome in the vacation cabin as the city home. This is not a costly luxury, and is one that will do much towards improving sanitary conditions. The

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division of the vacation party that presides over the kitchen will appreciate the convenience of turning a faucet when water is desired, instead of having to pump it by hand and perhaps carry it into the kitchen in a pail.

You can purchase electric- or gasoline-driven pump-and-tank outfits that will assure a constant and reliable water supply. The pump lifts water from a well and forces it into a tank that contains some air. The air is compressed at the closed end of the tank until the desired pressure is reached, when the motor or engine stops automatically. When a faucet is opened, the compressed air forces the water out through it. Electric pumps start automatically when the pressure drops below a certain point. Gasoline pumps are started by hand when the pressure becomes low.

The installation of pumps, water pipes, and other items of plumbing equipment can be undertaken by the average man. Modern plumbing consists mostly of assembling articles that are purchased ready to put together or install. Some pump sellers offer free engineering service to help the customer select and install the proper water system for his location and requirements.

SEWAGE DISPOSAL

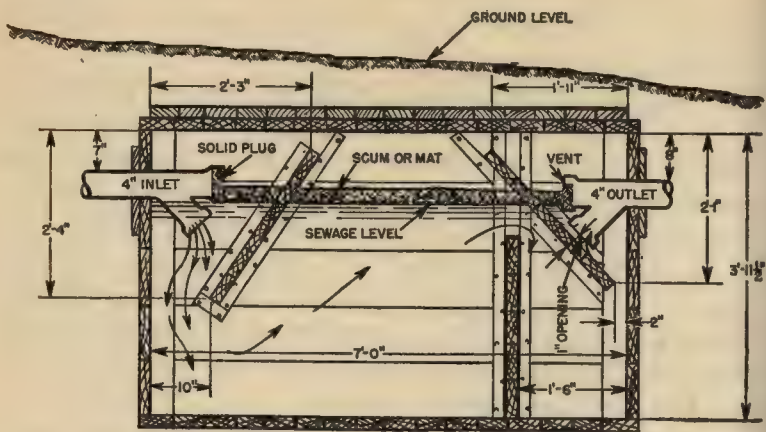
Close attention to the facilities provided for disposal of human excrement, garbage, sink drainage, and other waste materials will do much to increase the safety and pleasure of the cabin. The water supply and sewage disposal system should be considered when you plan your cabin, so that one will not interfere with the other.

There is one thing that most persons overlook: No matter what sanitary system you install, you must give it reasonable attention or it may become worse than useless. Periodic cleanings are necessary.

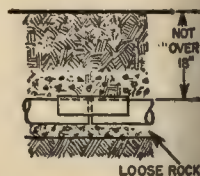
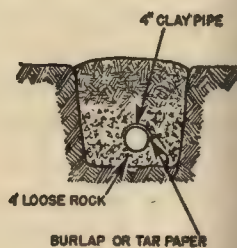
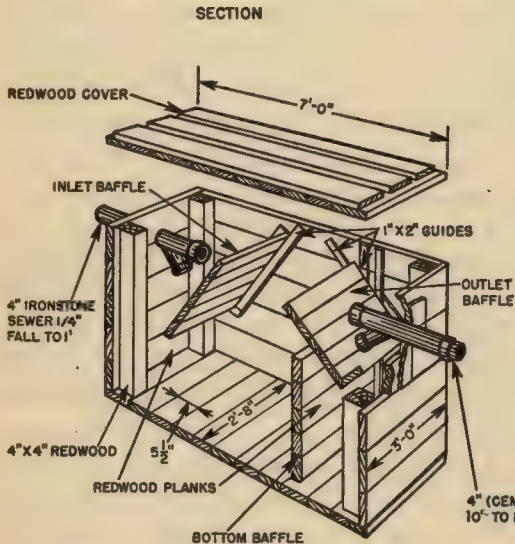
Among the items that are adaptable for summer-home

CABINS AND RANCH HOUSES

REDWOOD SEPTIC TANK



SECTION



The two sketches above show the construction of a wooden septic tank.

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use are various types of privies, septic tank systems, and sink-drainage wastage systems.

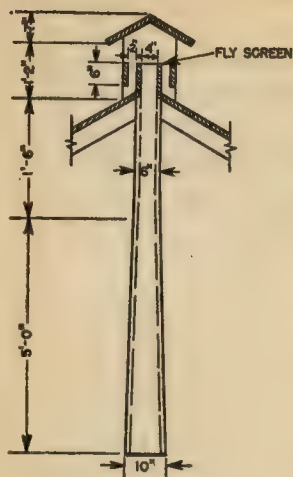
A visit to the average summer colony that does not have a sanitary sewer system indicates that there is a desperate need for an authority on the subject of outhouse construction. While the common privy has been made the object of untold quantities of humor, it too often works in league with death. Epidemics of serious diseases have been traced time and again to insanitary privies.

Government publications such as Farmers' Bulletins have dealt with the proper disposal of farm sewage. Since a woodland cabin presents a problem identical with that involving the farmhouse, the cabin owner will find it worth while to consult such sources of information. Lists of available publications can be obtained from the Superintendent of Documents, Washington 25, D. C.

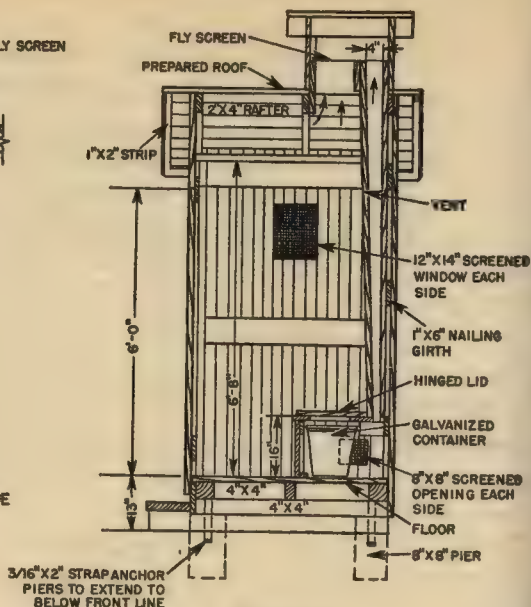
The outside privy should be located at least 100 ft. from the water supply, and on a lower level. It should be in a concealed spot, camouflaged by bushes, arbors, vines, or other means. Waste matter should not be discharged upon the ground, but should be retained by metal pails, concrete vaults, or chemical tanks.

One of the simplest outdoor privies is the pail type illustrated. Note that considerable effort has been devoted to the providing of proper ventilation, and that all ventilating and lighting openings are screened to prevent insects from entering. The seat, of painted lumber, is hinged so that the metal container can be removed. This container is emptied at frequent intervals, the contents being buried a few inches beneath the ground, in a remote spot where there is no possibility of causing pollution of wells or streams. In the soil, the material decomposes naturally and eventually becomes harmless. Do not use this waste matter for fertilizing gardens or shrubbery. It is a source of danger.

CABINS AND RANCH HOUSES

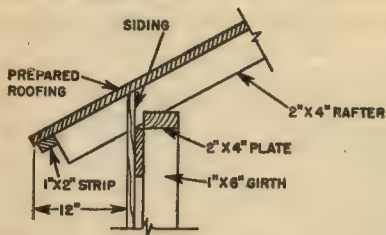


FRONT ELEVATION OF VENT FLUE

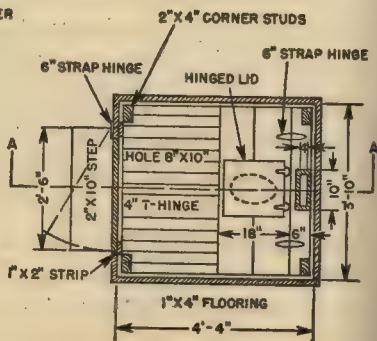
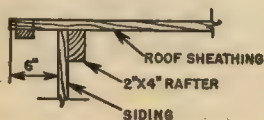


SECTION A-A

DETAIL OF SIDE EAVES



DETAIL OF GABLE EAVES



A ventilated pail privy suitable for a cabin site.

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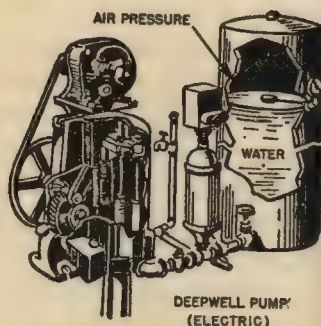
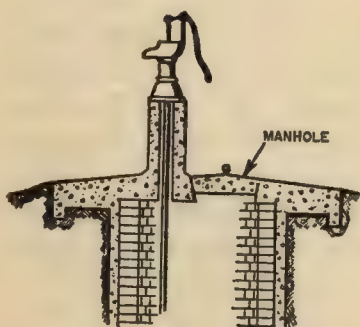
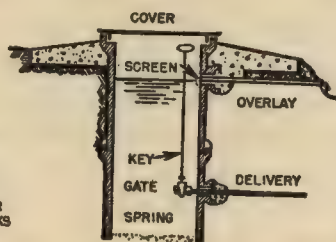
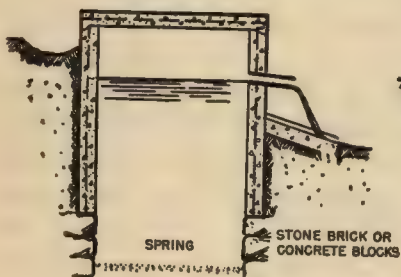
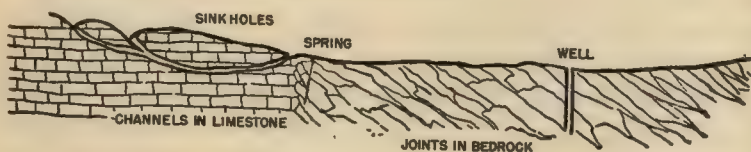
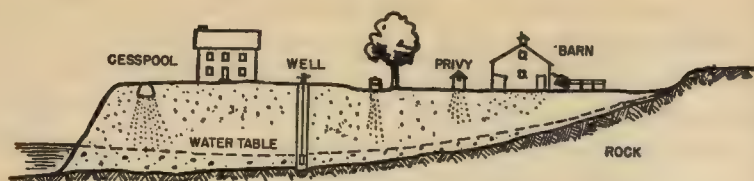
A more elaborate arrangement is the vault privy. A water-tight vault of concrete is constructed, and above it a well-ventilated house built. Care must be taken to build the vault and wooden structure so that flies and other insects cannot enter to carry away filth that eventually might reach your table and food. The vault, as shown in the drawing, is shallow and so designed that it can be cleaned regularly.

For indoor installations where sewerage facilities are not available, chemical closets are satisfactory. Various types are on the market. The waste matter is retained in a metal pail or tank, and chemicals added to render it supposedly harmless and inoffensive. Chemical closets have to be emptied at intervals, and the contents buried or otherwise destroyed.

Caustic soda is commonly used in chemical closets. When sufficiently concentrated and mixed well with the contents, it and similar caustic materials dissolve the solid matter and destroy bacteria. Coal-tar products and other disinfectants have been employed in chemical closets. They do not dissolve solid matter, but are good deodorants and germ-killers. It is essential that any of these chemicals be mixed thoroughly with the waste matter. For this reason, some types of chemical closets are equipped with mechanical agitators.

Chemical disinfectants and deodorizers can be used in pail and vault-type privies. Among those substances that have been employed are quicklime, which gives off heat when in contact with water; chloride of lime; ordinary lime mixed with water (whitewash), and applied frequently to vaults, walls, etc.; iron sulphate, $\frac{1}{4}$ lb. to one gallon of water, used as a deodorant for drains and vaults. Some sanitary experts recommend that the contents of a privy vault be sprinkled daily with some material that will absorb moisture and odor. Among the materials suggested in addition to some of the above are ashes, sawdust, loose dry soil, charcoal, powdered peat, and ground gypsum.

CABINS AND RANCH HOUSES



In the illustrations above, the wrong way of disposing of sewage is shown. In this arrangement of well and privy, unsanitary conditions are sure to prevail. Lower drawings show a typical electric pump system, and ways of enclosing springs and wells.

MODERN CONVENIENCES

Drainage from kitchen sinks has to be disposed of in a safe manner, if strictly sanitary conditions are to prevail. One method is to conduct the drainage through well-cemented vitrified tile to a point at least 100 ft. from any well and below it. There the liquid enters a blind drain from which it seeps into a bed of coke, gravel, coarse sand, stones, cinders, slag or broken brick. This bed is 18 in. deep, and covered over with strips of tar paper, a layer of straw, cornstalks, or other material that will keep the foot-thick layer of soil above it from washing down among the loose material. The sink waste is distributed through the bed by a few lengths of tile, laid with open joints and the hubs down hill.

A septic tank system is perhaps the most efficient method of disposing of both sewage and sink drainage, when running water is available. A septic tank is essentially a buried tank of concrete, brick, metal, or wood in which the sewage rests for a day or so while natural action of bacteria converts some of the solid material into liquids and gases. The liquids drain off into a distribution field and eventually enter the ground, while the gases escape through vents.

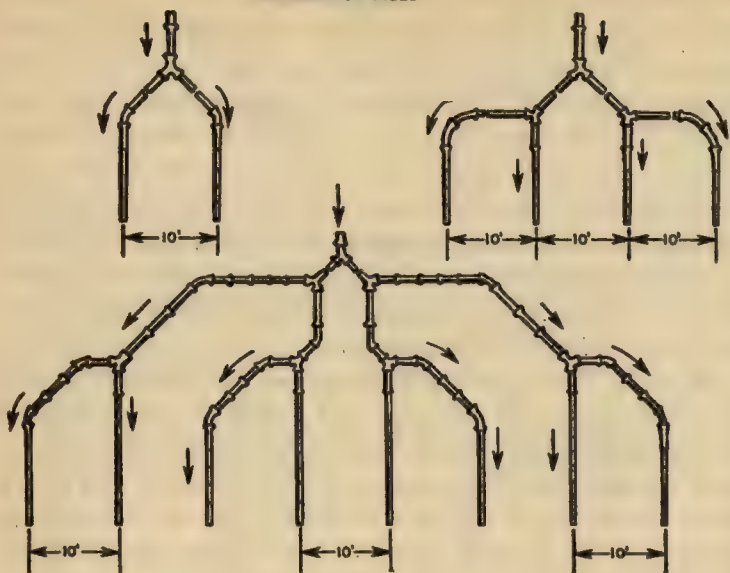
Contrary to general belief, a septic tank system is not a complete method of getting rid of sewage. Only a portion of the solid matter is destroyed, and odor is not lacking. The overflow or effluent is highly charged with bacteria and therefore is dangerous if released where it can contaminate wells, springs, or streams.

A septic tank system consists of several parts. The sewage is conducted from water-flushed toilets and sinks and bathtubs through a water-tight sewer made of glazed vitrified sewer pipe, cast-iron soil pipe, or concrete pipe, to the septic tank, which should be at least 50 to 100 ft. from the house. A 5-in. sewer having a fall of not less than $1\frac{1}{2}$ ft. for every 100 ft. of length will serve for most installations.

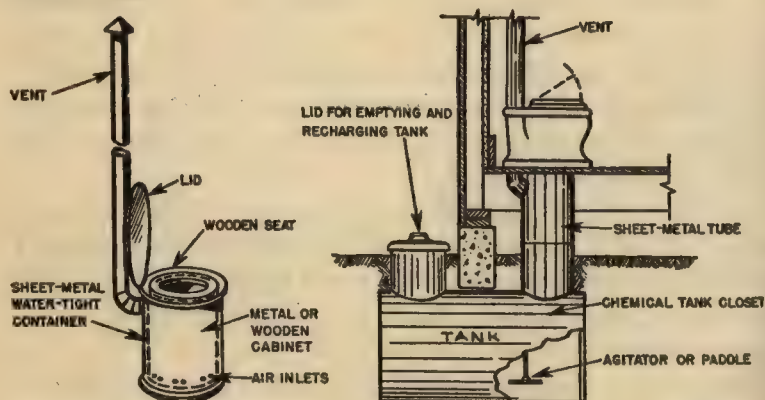
The septic tank is buried in the ground, either with the top level with the ground surface or 1 to 2 ft. below it, de-

CABINS AND RANCH HOUSES

ARRANGEMENT OF TILE
DISTRIBUTION FIELD



CHEMICAL CLOSET



Top: Arrangements of tile for distributing effluent from septic tanks of different capacity. Bottom: Two forms of chemical closets.

MODERN CONVENIENCES

pending on the severity of winter weather in the locality. It is desirable to keep the tank temperature high enough at all times to favor bacterial growth. The tank, no matter of what it is constructed, should be covered tightly.

There are various designs for septic tanks. All of them consist essentially of a walled vault with an inlet on one side and an outlet on the other, and with baffles to prevent incoming currents from agitating the contents or from escaping immediately through the outlet. Septic tanks made of rust-proof metal can be purchased. In addition, a grease trap is desirable, to keep kitchen grease from clogging the tank. However, if the cook is careful and disposes of grease with the garbage instead of letting it enter the sink drain, a grease trap can be omitted.

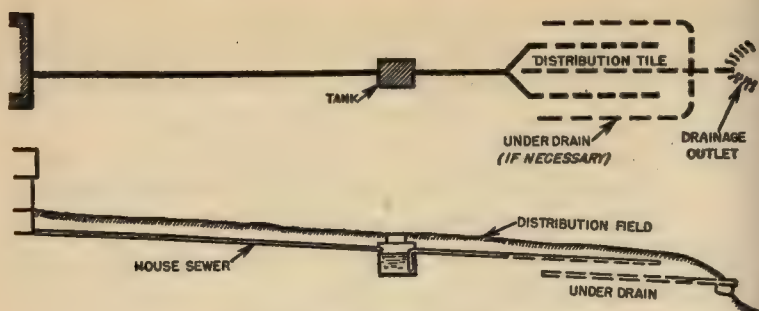
A simple septic tank can be built of brick. A cubical tank 2 ft. by 4 ft., and 5 ft. deep will handle the sewage of a half-dozen persons. The side walls of such a tank are 8 in. thick, the bottom 4 in. thick, and the inlet and outlet pipes arranged so that the liquid level will be 12 in. below the double plank cover. A wood baffle extending for 3 ft. below the level of the tank top, and placed 8 in. in front of the inlet sewer opening, prevents undue stirring of the contents.

Another simple septic tank is made from two 3-ft. lengths of 2-ft. vitrified sewer pipe buried vertically in the ground, and provided with a concrete bottom and top.

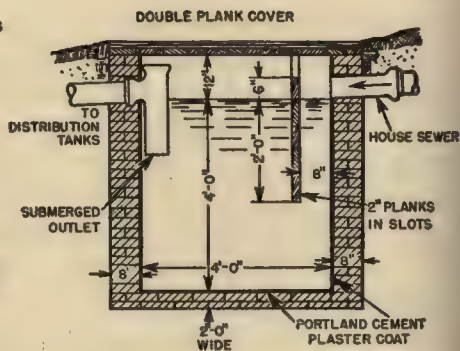
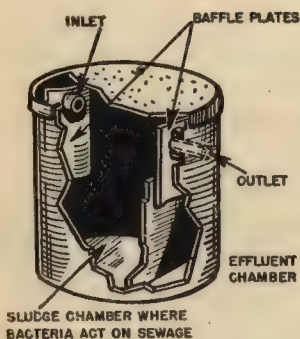
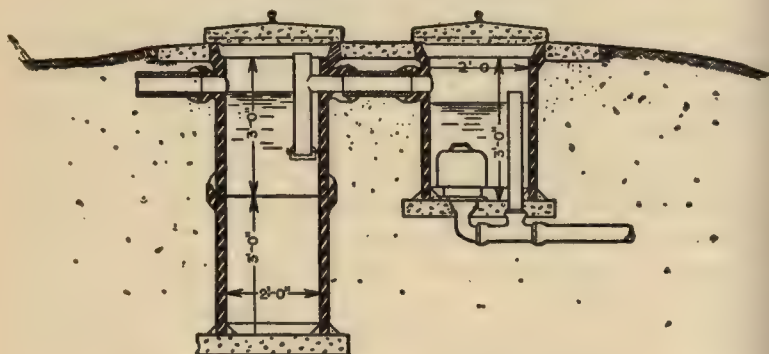
For year-round operation, a two-chamber tank can be installed. One of the chambers is where the sewage settles and undergoes bacterial action, and the other contains an automatic siphon that periodically discharges the effluent into the distribution field. Such siphons are not costly. Intermitent discharge is more desirable than constant wetting of the distribution field. A double septic tank can be built cheaply from 3 lengths of 2-ft. sewer pipe, one of which has double T-branches and another a single T-branch.

Several types of wooden tanks have given satisfactory

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PARTS OF A SEPTIC TANK INSTALLATION



Top: Typical septic tank system. Center: Two-chamber tank arrangement made of large tile. Bottom: Metal and brick septic tanks.

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service. One successful design was worked out by the University of California. Redwood is the material used because of its natural resistance to decay. The construction of such a tank can be undertaken by anyone familiar with tools. It consists of a rectangular redwood tank and a cover made of the same material. Two branched sewer pipe sections 4 in. in diameter are fitted to the tank as shown, the outlet pipe being 1 in. lower than the inlet. Note that the straight end of the inlet pipe is plugged, and that the corresponding end of the outlet is plugged also but has a vent hole at the top. Positions of the three baffles are shown in the drawings. Tanks of this type have been in successful operation for over 10 years. They require cleaning only at intervals of several years.

For a tank of the University of California type, the following materials will be required. Dimensions are exact.

Material: All-heart Common redwood (No. 1 common with sap eliminated).

4 pieces 4 in. by 4 in. by 4 ft. (rough) for corner posts (3 ft., 11½ in. net).

10 pieces 2 in. by 10 in. by 7 ft. surfaced on 2 edges, for sides.

3 pieces 2 in. by 10 in. by 7 ft. (rough) for cover battens.

10 pieces 2 in. by 10 in. by 3 ft. surfaced on 2 edges, for ends.

32 pieces 2 in. by 6 in. by 3 ft. surfaced on 2 edges, for bottom and cover.

15 pieces 2 in. by 6 in. by 3 ft. surfaced 1 side for baffles.

42 linear ft. 1 in. by 2 in., for baffle guides.

1 piece 1 in. by 6 in. by 6 ft. for 4 blocks at inlet and outlet.

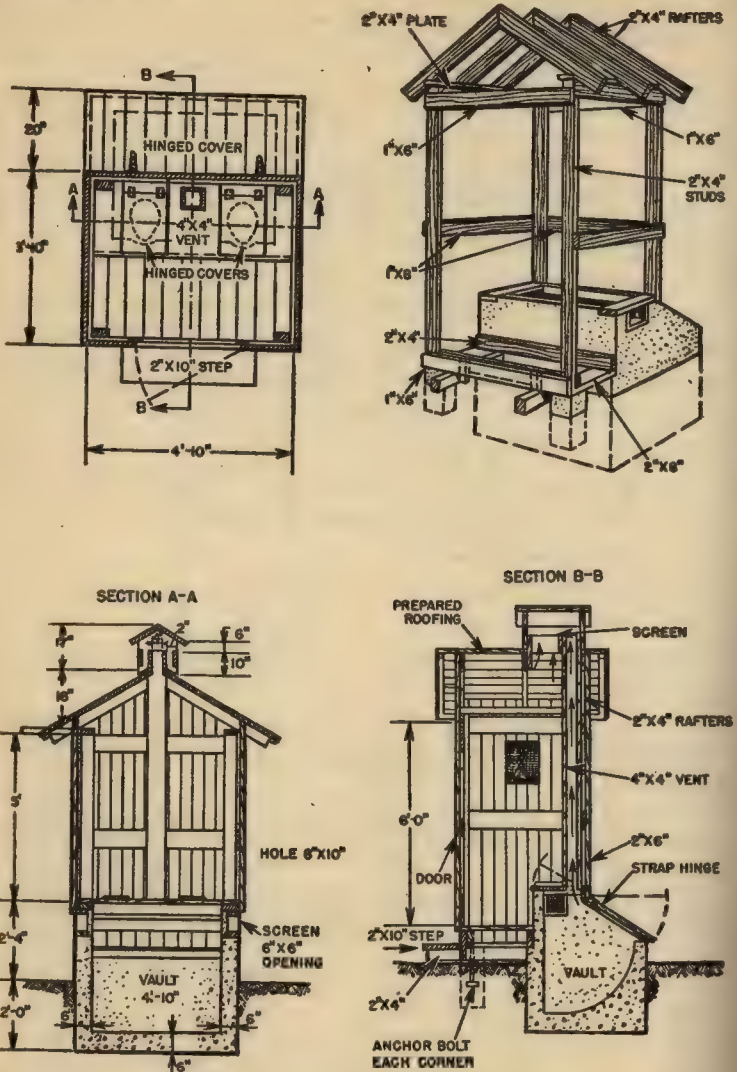
Total board feet required, 374.

Tile: Two 4-in. vitrified salt-glazed single Y-branch sewer tile for inlet and outlet.

Quantity of 4-in. bell-neck sewer tile and 4-in. standard

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TWO SEAT VAULT PRIVY



Construction details of a two-seat privy having a well-designed concrete vault.

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drain tile is dependent on position of tank with reference to source of sewage, and type and size of disposal field.

The liquid effluent from a septic tank, no matter what type, is discharged into a disposal or distributing field. This consists of a system of sewer pipe or drain tile laid with the joints open. It functions as a sewage filter for the sub-soil disposition of the waste matter. Proper construction is essential for success. The field should not be placed near a well or other source of drinking water.

A porous soil is best for a disposal field. The average soil is not the ideal kind, so it is advisable to provide plenty of area, say 500 sq. ft. for each person served by the system. A good grass sod, with no trees or shrubbery, should be cultivated on the area after the tile sections are in. When the soil is of a dense, clay-like nature, it is plowed or otherwise loosened, and perhaps under-drained in a manner similar to that employed for cultivated fields.

After about 10 ft. of outlet tile are laid from the septic tank, a branched system or tile, resembling in form a pitchfork having two or more tines, is constructed. Assuming that the septic tank will discharge 20 gallons per person into the disposal field at one time, the branched system can consist of 50 ft. of 3-in. tile per person, the branches being laid 10 ft. apart. Second-quality sewer pipe in 2-ft. lengths, or good quality drain tile in 1-ft. lengths, is suggested.

Proper construction of tile joints is important. When more than two branches are laid in the disposal system, a diverting box—a common distributing center for all branches—is employed. Tile from the tank to this box can be laid with cemented joints. Then, from the distribution point for a distance of a few feet along each branch, lay the tile with joints close, but do not cement them. Continue with joints spaced $\frac{1}{8}$ in. apart, until the last 20 ft. is reached, when the joints are $\frac{1}{4}$ in. apart. Each branch can be ended in a T-section, one end of which projects above the ground to act as

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a ventilator, a cap of some sort keeping out dirt. An elbow can be used instead. This ventilator also acts as a marker for finding the tile line if it is necessary to dig it up. Each open joint must be protected from loose particles. This can be accomplished by covering the upper part with an 8-in. piece of tar paper that extends about $\frac{3}{4}$ the distance around the tile. Another method is to lay a board over the joint. A third method is to use bell-end sewer pipe and separate the joints a fraction of an inch, centering the nozzle end of each pipe in the bell of the other by putting a few pebbles at the lower part of the joint.

When the soil is sandy, a fall of 1 in. every 10 ft. is satisfactory. For dense soil, the fall is 1 in. every 60 ft., and the openings in the tile joints are increased slightly. For very poor drainage conditions, the tile can be laid in a bed of cinders, slag, gravel, crushed stone, or broken brick, in a ditch a foot wide at the bottom. Depth of tile below the surface varies from $1\frac{1}{4}$ to $3\frac{1}{2}$ ft., according to climate. Each branch of the disposal system should not be over 100 ft. long.

Do not add disinfectants to sewage that is to be treated in a septic tank. Such disinfectants may kill beneficial bacteria on whose growth the action of the tank depends.

Local county agricultural agents, health authorities, state agricultural colleges, the U. S. Public Health Service, and the U. S. Department of Agriculture are among the possible sources of information on septic tank systems.

COOKING AIDS

Kitchen stoves and other cooking and housekeeping aids need not be of an elaborate nature for average cabin use. The type of stove will be determined by the fuel to be employed. Wood, coal, gas, kerosene, gasoline, and electricity are possible sources of heat. Of course, electricity and natural gas are more convenient, but not always available.

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A convenient type of fuel for cabin or camp use is bottled gas, often called "LPG" (which means Liquid Petroleum Gas) or propane. It has been used extensively for domestic cooking and heating, and in many localities a regular service is maintained for replacing exhausted steel bottles with charged ones whenever the necessity arises. A pair of containers is mounted in a cabinet outside the house, and connected to the gas stove, water heater, etc. Only one bottle is permitted to discharge into the pipes at a time. When it is empty, the other bottle is cut in, and the company supplying the gas is notified, so that the empty bottle can be replaced.

Small bottles of acetylene or other fuel gas are obtainable at reasonable cost. A tank of acetylene 6 in. in diameter and measuring 24 in. overall will cook a surprising number of meals, when connected to a suitable hot plate. One-burner hot plates can be operated directly from a tank; two- and three-burner types require a reducing valve. An acetylene tank can also operate powerful lamps and searchlights.

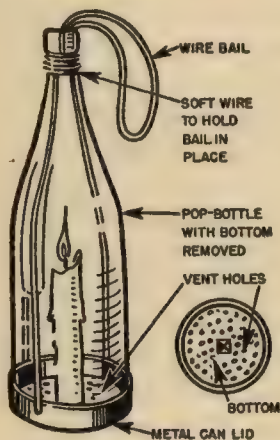
Hot water, usually considered a city luxury, can be provided in the cabin at a cost surprisingly low. There are available various kinds of heaters using wood, coal, gas, or kerosene as a source of heat.

There is one source of heat to which the average cabin or cottage owner never gives a thought. It is the sun. Since most of the vacationing will be done in summer, a simple solar heater will prove efficient in many localities, particularly the South. Such a heater consists simply of several lengths of black iron pipe connected by U-shaped couplings so that a grid arrangement results, placed where the sunlight will strike it a good part of the day. A 30-gallon hot-water tank placed above the level of the heating grid and not far from it, can be used as a storage place for the water. If well insulated with a jacket of asbestos or similar material, a tank will keep the water warm over night. The piping

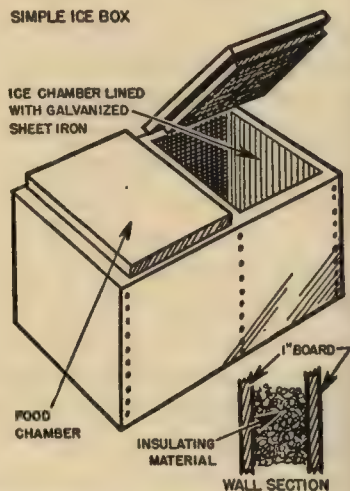
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must be arranged so the water will circulate through the tank and heating element. In hot climates, a single line of water pipe laid on the ground, in the sun, will deliver water hotter than the skin can bear.

SIMPLE CANDLE LANTERN



SIMPLE ICE BOX



You can make your own candle lantern and cabin ice box if you follow the directions given above and in the text.

Keeping food cool is a problem in the summer cottage. When a supply of ice is available, an ice box is the logical solution. Such a box can be built-in, with the main door opening into the kitchen and the ice compartment door opening on the porch. Anyone can construct a serviceable ice box by building a double-walled wooden case, with the space of 2 in. or more between walls filled with some insulating material such as rock wool. The box can have a hinged lid opening at the top, to cover the food compartment, and another lid for the separate ice chamber. The lids should be well insulated, but the partition between ice chamber and food compartment should not.

Chapter 15

BEAUTIFYING THE CABIN

MUCH has been said already about the beautifying of vacation homes—the use of colored drapes, proper interior wall finishes, and the like. For the benefit of the man who likes to do his own painting and to improve the looks of his cabin and surrounding grounds in other ways, more specific information will be included in this chapter.

The real log cabin or one covered with log siding can be left to weather without further treatment. The wood will, in time, take on a color and texture that probably will be some shade of gray or brown, depending of course on the type of wood. However, it is desirable at times to apply artificial coloring agents. These usually exert a preservative action as well.

Mention has been made of a mixture of one third turpentine and two thirds linseed oil as a filler that preserves wood and at the same time affects its color slightly. Pine and cedar, for instance, are darkened a bit by this filler, and as time passes the color becomes richer and darker. Be sure that the linseed oil and turpentine are of good quality. First of all, purchase the turpentine or oil from a reliable dealer, and insist on the best grade. Boiled linseed oil is thicker and richer in color than the raw oil, and usually is preferable. Prices for these materials vary constantly. Low-priced linseed oil is likely to be mostly cottonseed oil.

Shellac is another useful finishing material. Use it as a filler and sealer beneath varnish, lacquer, or wax; and for sealing knots and resin streaks before painting. It is widely

used as a floor-finishing material. There are two colors of shellac, orange (natural) and white (bleached). The white is generally used where the original color of the wood is not to be changed. Various additional colors can be produced by adding pigments or dyes.

Buy only the best grade of shellac and get it fresh—not more than 6 months old. And use only a high grade denatured alcohol to thin it. Both these materials are available at all reliable paint stores. Usually a 4-lb. or 5-lb. cut is sold, meaning that 4 or 5 lbs. of dry gum shellac has been dissolved in each gallon of alcohol. Dilution is almost invariably required before using.

Floors: The secret of a good shellac finish on a floor is to apply several thin coats rather than one or two heavy ones, according to shellac specialists. To four parts of 4-lb.-cut shellac add one part alcohol. Brush this thinly on the wood and let it dry two hours or so. Smooth the floor by rubbing it lightly with No. 2/0 sandpaper or steel wool, brush or wipe off all dust, apply a second shellac coat, and let it dry at least two hours before walking on the floor. If you wish, you can wax the floor after the second shellac coat has dried. When worn spots develop in a shellacked floor, they can be renewed easily in the manner just described, without having to refinish the entire floor.

Unfinished Furniture and Plywood Paneling: There are various routines, but one that should be satisfactory in nearly all cases is: Thin 4-lb.-cut shellac with three times its volume of alcohol, brush this on the wood in a direction parallel to the grain, let dry an hour, and sand lightly with fine sandpaper or steel wool. Wipe off dust with a tack rag or a cloth moistened with turpentine. Then apply two or three more coats of shellac that has been thinned in the proportion of equal parts of 4-lb.-cut shellac and alcohol, let each coat dry 3 hours, and sand and dust as before. The final coat may be treated (a) by rubbing with fine steel wool to produce a

BEAUTIFYING THE CABIN

slightly dull effect, (b) rubbing with pumice stone and oil or water for a satiny effect, or (c) applying two coats of furniture or automobile wax, polishing each. To change the color of the wood before giving it a shellac finish, shellac specialists recommend a water stain. Water raises wood grain, so it is a good idea to wet the wood first with clear water, let it dry, and sand to remove any raised grain. Wood colored with an oil stain can be shellacked: the stain should be dry.

You can use shellac as a sizing for the chinking of log cabin walls, as a finish for chair seats made of twisted paper, rattan, or cord; as an undercoater for paint and varnish on soft woods, and so on.

Stain is a useful finishing material for the cabin and its equipment. With a few cents' worth of burnt umber, raw sienna, Van Dyke brown, and drop black, together with a quantity of turpentine and linseed oil, and maybe a few lake colors, you can make a wide variety of stains, and imitate almost any antique finish. The best way to determine what color and how much to use is to experiment. Mix some of the coloring material with turpentine, apply the resulting stain with a brush, let it soak into the wood for several minutes, and then remove the excess with a cloth.

Starting with the linseed-oil-turpentine mixture already mentioned as a filler for cabin exteriors, you can produce various stains by using with it the oil pigments, lake colors, or dry colors. Burnt sienna gives a reddish brown. A darker brown is obtained by adding some black pigment. Black and red give other browns. To produce gray, add some white lead and black oil pigment or drop black to the turpentine or turpentine and oil. Small quantities of red are sometimes desirable to remove the cold tone of gray stain. Green is produced by mixing blue and yellow colors with turpentine, varying the relative amounts to produce different shades. Various green pigments such as chrome green can be used,

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and combined with black or yellow pigments to lighten or darken them.

Oil stains, which are essentially nothing but paints made very thin, are more convenient to use than water or acid stains because they can be applied with a brush and do not raise the grain of the wood. Various interesting effects can



Your cabin can be provided with this simple and attractive gate and trellis.

be worked out by using stains. For instance, the grain of white pine can be brought out by applying a stain consisting of pigments mixed with linseed oil, turpentine, and a little drier. Apply this to the wood evenly and let it remain until partly dry. Then rub with a cloth. The rubbing action forces the stain into the soft portions of the wood but removes it from the harder resinous parts, thus causing the grain to stand out more prominently. This is the action that takes place in almost all staining operations that involve wiping with a cloth.

BEAUTIFYING THE CABIN

Usually, after staining wood, especially furniture and woodwork, a clear finish that resists wear is applied. This may be white shellac, lacquer, varnish, or wax. Thinned shellac is often used as a sealer over stain and under lacquer, varnish, or wax. Also, special wood sealers are on the market.

An important outside use for stains is to color and preserve wood shingles. Creosote stains, procurable ready-mixed, generally are preferred because of their high preservative action. Shingles are stained by dipping and draining off excess stain, and are not soaked in the stain. They usually are dipped for two-thirds their length. Then they are piled loosely, so that air can circulate through them, and left to dry. After the shingles are laid, a second stain coat can be applied with a brush.

The cabin that is in a gloomy forest can be made more lively by introducing some color into the roof. Stain several batches of shingles different colors and apply them in random fashion, to produce a mottled effect. It will not be found out of harmony with the setting, if properly done, even when bright colors are used.

The use of paints for exterior and interior finishing is applicable to all types of cabins, lodges, and the like. Even a log house can be made more attractive and durable by proper use of paint on doors, window sash, and floors. The paint can be of the prepared type obtainable everywhere, or can be mixed on the job from white lead, linseed oil, color pigments, and drier. Turpentine is added with the oil for exterior prime coats, to hasten penetration. When using prepared paint, thin each gallon with 1 to 1½ quarts of turpentine, for the prime coat, or as the manufacturer directs.

A highly important matter is to mix all paint thoroughly just before using. Paint, when left standing, settles, so that it should be mixed each time it is used. Proper mixing will eliminate a lot of painting grief.

Knots and streaks in pine and other woods, which are

CABINS AND RANCH HOUSES

likely to ooze resin and cause later scaling of paint, should be treated with a coat of shellac or an application of aluminum paint before the regular paint is put on.

After the prime coat has dried for three or four days, putty all holes in the wood and apply the second coat. Use the paint as it normally is mixed, if but two coats are to be given. This gives a glossy surface. Addition of a little turpentine, say a pint to the gallon, will produce a slightly matte surface. If three coats are to be applied, the second coat can be thinned slightly with turpentine. When applying the paint, remember that the secret of producing a good job is not to pile it on thickly, but rather to brush it well into the wood. Paint in thick layers will peel sooner or later.

Floor paint differs from ordinary exterior paint in that it contains varnish that increases its durability. For shutters there is a special chrome-green shutter paint that is used for the finish coat.

There is a trick that can be used to make the small lake cottage or other summer home look larger. This trick is to use proper colors that give the impression of greater size. Cream, ivory, and other light, warm tints will do the trick, and will harmonize with a great many other colors. When there are no near-by trees, grayish greens and light grays can be used with a similar effect. A long, low, rambling effect, so desirable when the building nestles among the trees and has aspirations to be informal like an old-fashioned log cabin, can be enhanced by proper use of color. Thus a weather-boarded lake cottage can be divided by a horizontal line running around it about half-way between eaves and foundation, and the lower half painted a dark tone and the upper part a lighter color. Another way is to shingle the upper half and stain it a light gray and paint the lower half a darker tone. With these schemes a dark-colored roof should be employed. When the process is reversed and the

BEAUTIFYING THE CABIN

lower part of the house made lighter than the upper half, a top-heavy effect is produced.

If the surface has been painted before, it is important that all old, scaly paint be removed by a vigorous work-out with a wire brush. Caution: Avoid inhaling the dust: a respirator is a wise precaution. The prime coat should be thinned with turpentine and thoroughly brushed into the wood.

For the woodland cabin, a yard that looks as nearly like the native woods as possible is desirable. When building the cabin do not cut or let anyone else cut any trees that are not dangerous or that do not stand where the cabin is to be placed. Likewise, refrain from trimming trees and removing branches near the ground, unless the branches constitute a hazard to heads of the cabin occupants. After the cabin is completed and has been in use for a while, you will be able to decide what trees should be removed or what branches cut away, so that you can enjoy a beautiful vista or take advantage of prevailing breezes. Native shrubs are desirable in the cabin yard. These can be transplanted without trouble. This is true of wild flowers. Flowers such as pansies and begonias somehow look out of place in the woods. They may, however, appear perfectly at home by a lake cottage.

Trellises and rose arbors are useful for general decoration and for camouflaging outdoor privies and the walks that lead to them. The usual white-painted framework is out of place in a rustic setting. A better way is to use poles of some wood, such as California redwood, that does not require painting in order to keep it from rotting. Redwood and cypress are naturally resistant to weather and decay. Unpainted pine and other woods will last a long time, too. It is a good idea to apply hot creosote to the portions of poles and stakes that will be buried in the ground. Pergolas and summer houses can be built of poles or any of the inexpensive woods. Such structures should always be in harmony with the main cabin, in design, material, and color.

Chapter 16

LONGER LIFE FOR YOUR CABIN

WHETHER you expect your cabin to bring you pleasure for a few years or a lifetime, it will pay you to take precautions against the natural enemies of wood structures, namely decay and insects.

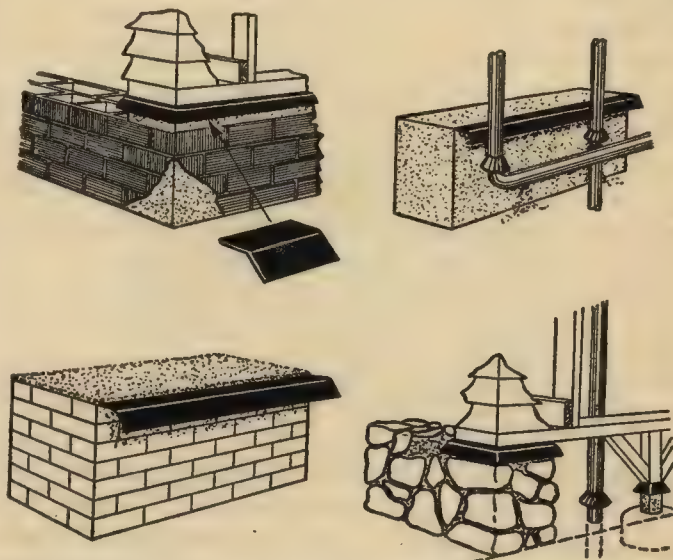
Decay is caused by the growth in the wood of tiny plants called fungi. Moisture is absolutely necessary for such growth, and therefore only moist wood can decay or rot. This simple fact is overlooked by many cabin builders who, it would seem, deliberately arrange conditions that promote decay.

Numerous ways of retarding or preventing decay already have been mentioned. The use of suitable piers for supporting the structure off the ground is little more than common sense, yet we find many cabin builders laying the lower course of logs or the wall sills and joists directly on the ground. Of course, some woods such as cypress, redwood, and cedar will withstand such treatment for a long time; but this does not provide sufficient excuse for omitting a good foundation. For reasons that will become clear later, it is desirable to have the cabin at least 18 in. above the ground. The foundation should, of course, be of a type that will keep the sills dry. Also it should not be closed up tightly so that air cannot circulate beneath the floor. The lack of ventilation will enable the joists and other wood parts to remain constantly damp, and therefore invite decay.

Further guarantee against a constantly damp building is provided by proper drainage. Selection of the cabin site should be made with this in mind.

LONGER LIFE FOR YOUR CABIN

It is probably true that the majority of losses through decay in buildings, no matter what the type, could have been avoided by proper attention to construction details. Carelessly laid logs or improperly applied weatherboarding may create pockets that will hold water for long periods, and result in eventual rotting of the wood at such points. Log



Illustrations show proper manner of construction to keep termites out of cabin and preserve its wood. Black strips and collars are sheet-metal termite shields.

walls should be laid so that water will not remain in cracks and crevices for a long time. This means proper notching at corners, thorough chinking, and careful fitting at window and door openings. During a rainstorm, water may collect in many places, but if it dries out within a reasonable time, no harm will result. It is only the permanently damp places that invite the destructive fungi.

Window and door casings should be assembled and set in

CABINS AND RANCH HOUSES

place with care. It will pay you to apply white lead to all joints where there is likelihood of water entering and remaining. Fit weatherboarding and shingles tightly around windows and doors. See that the roof is perfectly watertight. Insist upon porch floors that are laid with open joints or that have the tongue-and-groove joints coated with white lead thinned with good linseed oil. Shingle roofs generally are laid on boards that have spaces several inches wide between them, so that air can circulate about the shingles and keep them dry.

Do not depend too much on preservatives such as oils, creosote, and paint. These substances may retard the entrance of moisture and the flourishing of decay organisms, but they by no means are infallible in preventing them. There seems to be a general belief that paint effectively seals wood against the entrance of moisture. For one thing, a board used as part of a building seldom is painted on all surfaces, so that moisture and decay can creep in behind the paint layer. Perhaps you have seen lumber that is rotting beneath a perfectly sound coat of paint.

In general, the life of a cabin, cottage, lodge, or other building can be prolonged by routine care that is familiar to everyone. Prompt replacement of damaged and decayed timbers, keeping the roof in constant repair so that it does not leak, and periodic applications of good paint, will work wonders in this direction.

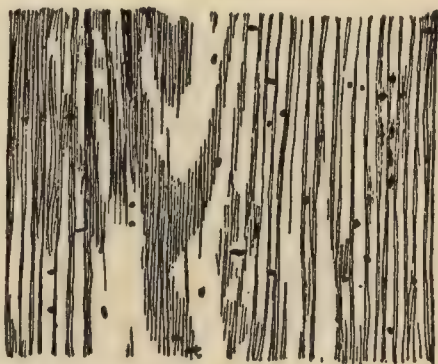
Log cabins, rustic woodwork, and wood that has not been thoroughly seasoned are most likely to be attacked by the bug army, although there are, in some parts of the United States, insects that will work damage to any building, if they can get to it.

More than one proud owner of a rustic summer home made of logs has had his joy turned to sorrow by finding that his home contained year-round guests that showed their gratitude by chewing the logs to pieces. It is to prevent such

LONGER LIFE FOR YOUR CABIN

disappointment and financial loss that cabin owners have been demanding information on insect control.

Among the woods most commonly used for log cabins, rustic furniture, and fences are hemlock, fir, tamarack, spruce, pine, cedar, juniper, hickory, birch, oak and poplar. Naturally some of these woods are less likely to be attacked by insects than others. But they all require protection of some kind or other in most instances.



The black dots in this log are holes bored by the ambrosia beetle.

Proper cutting of logs and poles will do much to prevent insect damage. The best months for cutting, when the bark is to be left on, are October and November. Logs should be stacked where they are not in contact with the ground, and in such a manner that air will circulate about them. While cutting logs in late fall does much to discourage the attacks of bark beetles, whose tunnels cause the bark to loosen, it has been found that spraying the entire log with coal-tar creosote diluted with three times its volume of kerosene will provide additional protection by keeping adult beetles from laying eggs in the bark. Further details of such treatment can be found in bulletins issued by the Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture.

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When the poles or logs are to be peeled, they can be cut at any time and treated at once, after peeling, with a mixture of one part creosote and three parts of kerosene. The creosote, when thus diluted, is not exceptionally strong-smelling, and stains the wood only slightly. Peeled logs should not be left lying on the ground, or they may be attacked by pinhole borers.

Some beetles, such as roundhead borers and powder-post insects, will attack logs no matter when they were cut. Chemical warfare must be resorted to. There are two chemicals suitable for use. One is the creosote already mentioned. The other is crude pyridine, a colorless liquid that produces almost no stain. Both of these substances possess strong odors, and should be handled in the open. Precautions should be taken to keep them off the skin and particularly out of the eyes. Like creosote, pyridine can be diluted with three parts of kerosene for treating wood.

Apply creosote or pyridine to the logs, poles, or timbers after they have been shaped, but before they are installed in the building, and let them dry thoroughly in the open. One way is dipping. Long, narrow troughs of sheet metal can be constructed and used as dipping vats. They should be just large enough to admit the pieces. When the wood is in position in the building, it can be treated by application with a brush or spray outfit, but such treatment is less effective than the dipping method before erection because all parts of the wood are not reached.

If the insect invasion has started, and the cabin owner finds that his walls are alive with beetles or their grubs, different tactics and ammunition have to be employed. Two more chemicals enter the scene. They are crude orthodichlorobenzene and paradichlorobenzene. The first is a colorless liquid that, like pyridine, should be kept off the skin and out of the eyes. It will kill grass and other vegetation if it comes in contact with it. Paradichlorobenzene is a white,

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crystalline substance with a strong odor. It is used in anti-moth preparations and for killing peach-tree borers. When employed for treating wood that has become infested with insects, it is dissolved in three parts by weight of kerosene. These two substances kill the insects by means of poisonous gas that they liberate slowly. Kerosene alone may be effective. Caution: Keep in mind the fire hazard.

Orthodichlorobenzene or a solution of paradichloroben-



Piece of hickory with bark and a bit of wood removed to show tunnel cut by an adult powder-post beetle.

zene in kerosene can be applied to the wood with a brush or spray gun. Thorough covering is essential. A gallon will cover about 50 sq. ft. of wood or log surface. Avoid breathing the spray.

Numerous methods have been proposed for impregnating the wood of growing or felled trees with chemicals that will retard decay and insect attack. The U. S. Bureau of Entomology and Plant Quarantine, Washington, D. C., has worked with methods of introducing water solutions of such preservatives as copper sulphate and zinc chloride into standing or recently-felled trees before branches have been removed.

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Solutions can be introduced into a freshly-felled tree by smoothing the bark at the butt end, slipping an old inner tube or other container over the end, and filling it with the solution. As water evaporates from the tree leaves, the solution is drawn into the trunk, saturating the sapwood in a matter of days.

To introduce solutions into a standing tree that is to be cut down soon, the bark near the base is smoothed and a deep groove sawed or chiseled around the trunk. With rubberized fabric, impregnated paper, or plastic or rubber sheet, a pocket or container for holding the preservative in the groove is formed. The solution is gradually taken up by the tree, over a period of a few days, until the sapwood is saturated with it.

Such treatments are helpful when the tree is to be converted into cabin logs or parts of rustic furniture, etc. Details of such processes are obtainable from the Bureau of Entomology and Plant Quarantine, or from its bulletins which may be found in local libraries or at agricultural experiment stations, farm bureaus, and similar agencies.

Another horde of insect pests likely to attack your cabin if it is in certain parts of the country, particularly the south, is composed of termites or "white ants." They look like ants, but are closely related to roaches. The particular type most likely to invade your property lives in moist ground at least part of the time. Termites of this species eat wood (cellulose), and will convert any building into a meal if it happens to be handy.

Termite invasion is not always as serious as professional termite eradicators might lead you to believe. Cases are on record of ancient buildings that have been inhabited by termites for a half-century, and probably much longer, and still are sound. On the other hand, a heavy infestation of termites may cause extensive damage to the wooden parts of a building and the furniture and books in it.

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The winged males and females that swarm from termite colonies in spring or fall are not the real cause of damage, although they may serve as a warning that the building from which they swarm is invaded. The wingless worker termites are the ones responsible for the destruction of wood by tunneling.

These "white ants," as they are generally called, avoid light as a small boy shuns a washrag. They go so far as to construct tunnels through which to travel in darkness. Furthermore, these termites must have moisture in order to



Here is an adult powder-post beetle. This is the pest that bored into the tree shown in the picture on page 177.

live, and they generally obtain it by descending into the ground. These facts are important in their control.

The insects enter buildings in a variety of ways. They bore directly into wood that is resting on the ground. If it is on a foundation that is cracked, they will wall up some of the cracks to form light-tight passages. If the foundation is sound, they may construct tunnels of earth and wood pulp over its surface, until the wood above is reached. They even have been known to erect these tunnels without support until they projected up from the ground nearly a foot. Buildings with basements sometimes are invaded through openings in the basement floor or wall.

The type of building that is most resistant to termites is one having no wood in foundation, basements, or elsewhere near the ground. The cabin that rests on 18- or 24-in. piers

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and has a porch floor and steps supported by concrete or masonry is reasonably safe.

Prevention of termite invasion consists in establishing a barrier between the ground and wooden parts of the building. Treatment after invasion includes breaking of their lines of communication between the building and the earth. It is absolutely necessary that the insects be able to travel back and forth between their earthen homes and their source of food, if they are to exist. When this is prevented by breaking the earthen communication tubes and establishing barriers, termites remaining in the building will die off quickly because of the lack of moisture. The only exception is when the wood is kept damp by a leaky water pipe or roof, or when a damp basement can be reached by the insects.

The presence of termites is indicated by the swarming of the winged insects, by presence of the communication tubes on foundation walls and pipes, or by sagging of floors, caving in of walls or other evidence of damaged wood.

Among the recommendations for termite control made by government experts are the following:

All wood nearer the earth than 18 in. should be made termite-proof by treatment with coal-tar creosote under pressure. Such treatment can be given at properly equipped plants to be found in termite regions.

Steps should be of treated wood or should rest on concrete footings that extend at least 6 in. beyond the steps.

Portland cement mortar should be used in masonry foundations, and all seams should be well filled. Termites can tunnel through poorly-made mortar joints.

The space under a building should be excavated until a clearance of 18 in. is produced, if that clearance does not exist already.

To prevent the building of shelter tubes by the termites, sheet-metal shields should be installed around the tops of foundation walls, around water pipes and wherever else a

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tube might be constructed. The shields consist of non-corroding sheet metal that is bent downward at a 45-degree angle, and that projects at least 2 in. in a horizontal direction from the surface being protected. Such shields can be installed on structures already built.

By proper selecting of wood you can avoid many of the troubles caused by decay and insects. Some woods naturally



Two of the wood-destroying pests. Left, an adult bark beetle, and right, an ambrosia beetle.

are resistant to these natural enemies, because of their chemical make-up. California redwood, southern cypress, and long-leaf pine are particularly resistant to termites. Redwood, cypress, cedar, and some other woods are likewise resistant to decay. The logical thing to do, when economically possible and when such woods can be employed in the type of cabin you have in mind, would be to use material that is resistant to both decay and insects. Of all the woods available, cypress, redwood, and some of the pines rank highest in this respect. When purchasing logs and poles for cabins, examine them to determine whether they are infested with borers.

Chapter 17

HUNTING AND FISHING LODGES

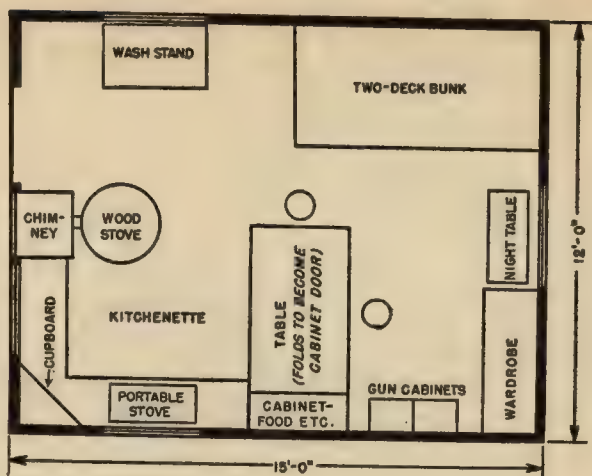
ESSENTIALLY the hunting or fishing lodge does not differ from any other cabin type. Therefore any of the plans and constructional details applying to the various cabins, week-end cottages, lakeside bungalows, and even tourist homes might be adopted for the lodge. In fact, it sometimes is difficult to draw a definite line of distinction between these various types of buildings.

A lodge is primarily intended to provide shelter and a place to sleep for the hunter or fisherman. It may be built by him for his personal use, on land leased or purchased, or it may be constructed by the land owner and rented to visiting fishermen and hunters. Such a lodge might prove as profitable as a tourist cabin along a busy highway.

Because little more than shelter and bunk room is desired by the sportsman who spends most of his time in the woods, fields or along streams, the hunting lodge can be the essence of simplicity. For two to four men, a one-room structure with built-in or folding bunks, wardrobes or plenty of wall pegs, a table and a corner to prepare grub, will suffice.

By using second-hand lumber and other low-cost materials, it is possible to build such a cabin without spending much money. A good width is 12 ft. and a suitable length is 15 ft. This will provide space for two bunks, one on each side of the room at one end. When four men are to be accommodated, the bunks can be double deckers; or a single double-deck bunk can be used for two men, leaving floor space for other uses.

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This simple, low-cost hunting lodge will accommodate as many as four persons comfortably. Typical floor plan for two persons is shown above.

A window in the end wall, between the heads of the bunks, admits light and air. Beneath this window can be placed a table, chest of drawers, or any other convenient piece of furniture. At the foot of each bunk a wardrobe can be built, to

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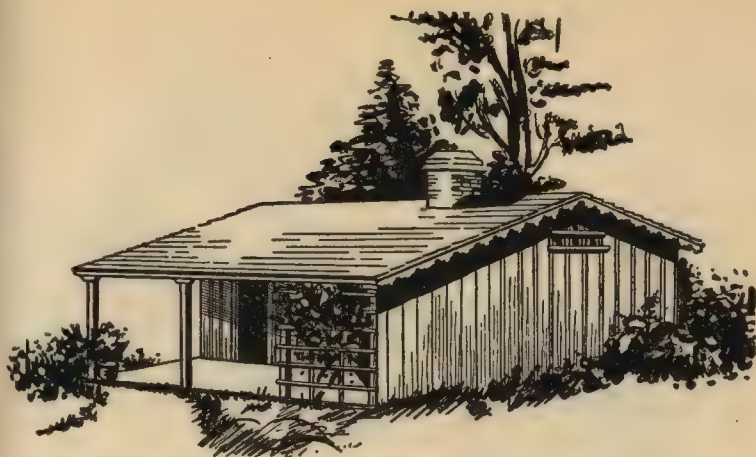
act both as a clothes container and a kind of partition to separate the bunks from the remainder of the cabin. By each wardrobe is a window. On one side, beneath the window, is a wash stand, with perhaps a mirror hung near-by. A good place for a shaving mirror is on a wood support that stands out a few inches from the window, or which can be swung down in front of it. This permits both sides of the face to be lighted so shaving is easy.

On the other side of the cabin, opposite the washstand, is a miniature kitchenette consisting of a shelf or table, a portable stove of some kind, a cupboard for storage of food, perhaps a sink, and a can opener. In the center of the room, towards the front, can be placed a stove, its pipe entering a chimney supported on a platform built out from the end wall. Simple, lightweight chimneys can be supported on platforms in such cases; but they should be well insulated from all near-by wood. A table that folds against the wall or serves as the door of a cupboard is suitable for dining purposes. The doorway can be at any place in the front wall, provided it is not blocked by the stove or other equipment.

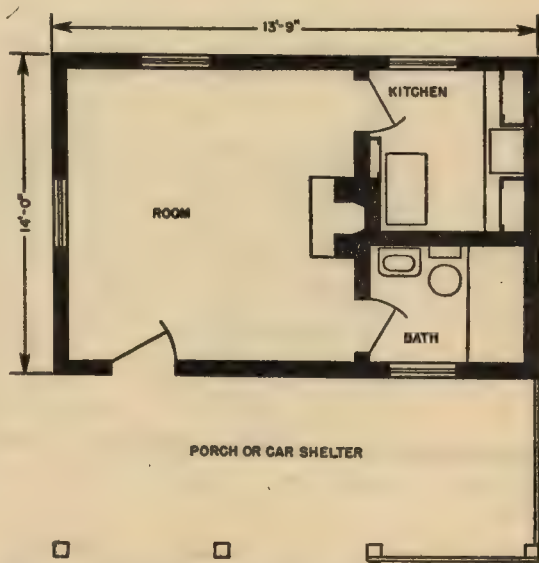
Because most hunters and fishermen travel to their cabins in automobiles, it is well to have a place to store the car. For such an arrangement, nothing could be more serviceable than one of the various tourist cabins described in another chapter. Such cabins frequently have car sheds or shelters built on one side as an integral part of the main structure. The cabin can, of course, be arranged inside in any convenient way. If the basic plan is a simple cabin rather than a tourist home, it should be an easy matter to build an extension roof at one side to form a car shelter.

The joy of a hunting or fishing expedition can be increased by giving some attention to built-in equipment and to proper sanitation. Everything that was said about the desirability of pure water and proper sewage disposal applies to the hunting lodge, although it would be uneconomical in most

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Tourist home which also could be used as a sportsman's lodge.

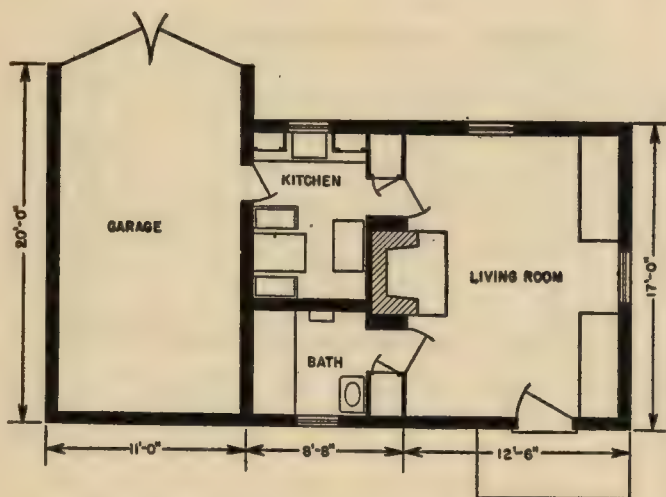


Floor plan of foregoing tourist home shows it is commodious and convenient. (Courtesy, California Redwood Association)

CABINS AND RANCH HOUSES



Here is another type of a simple tourist home that anyone can build.



Floor plan of the above home, showing the one-car garage.
(Courtesy, California Redwood Association)

HUNTING AND FISHING LODGES

cases to install elaborate disposal or water supply systems.

Because the fisherman may catch a bass or trout occasionally, or the hunter bag a deer or duck, some effective means of disposing of waste materials resulting from the cleaning of such quarry should be available. Fish never should be cleaned on the bank of a stream because the decaying animal matter will increase pollution. Likewise no one wants the cabin yard to smell like a garbage dump. One way of disposing of such refuse is to bury it in a pit located at a safe distance from the water supply. Another way is to burn the cleanings in a hot fire. A simple incinerator can be built near the cabin, using field stones cemented with mortar or piled loosely and perhaps banked on three sides with earth. The incinerator should not be placed where wind may blow sparks on the cabin or other inflammable material. Before leaving on the day's expedition, the occupants should see that the fire is extinguished. Drowning it with water is the recommended method for making certain of this.

Because hunting and fishing lodges are unoccupied for parts of each year, they should be equipped with strong doors and window shutters, to keep out intruders. It is not a bad idea to provide a cap for the chimney, to foil the efforts of birds and small animals that might try to invade the lodge. This cap can be a removable one consisting of a concrete slab or flat stone, or a permanent one made of heavy galvanized or otherwise non-corroding wire mesh.

Chapter 18

THE RANCH-HOUSE IDEA

ALTHOUGH the conventional log cabin and simple vacation "shack" of frame construction will remain popular for a long time to come, the popularity of the so-called ranch house in city and suburban building has influenced the design of vacation, resort, and country homes. In reality, the modern ranch house is not very different basically from cabins and lodges described in other chapters of this book. One-story, rambling, low-pitched roof, simple materials, a minimum of ornamentation, charming informality . . . all of these terms might apply equally to a ranch house and to the cabin in the woods. Even though it can be but a slightly refined version of the conventional summer cabin, the ranch house brings up a few special problems in planning and construction.

A study of house-plan books, a drive through a section where new homes are being built, and talks with architects and builders may leave you somewhat confused as to what a "ranch house" really is. You may be surprised, for instance, to learn that a "ranch house" can look very much like the "colonial" type so popular a few years ago. From the standpoint of outside appearance, there can be considerable variety in ranch-type homes.

The ranch-house idea is said to have originated in the areas where early Spanish settlers and others erected homes for the sole purpose of providing shelter while they fought Indians and established ranches. Probably little thought was given to appearance, so that any ranch-house characteristics

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that have been handed down to present-day builders were, originally, purely functional necessities dictated by climate, materials available, and the abilities of the original builders.

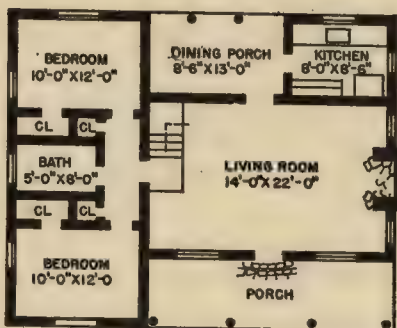
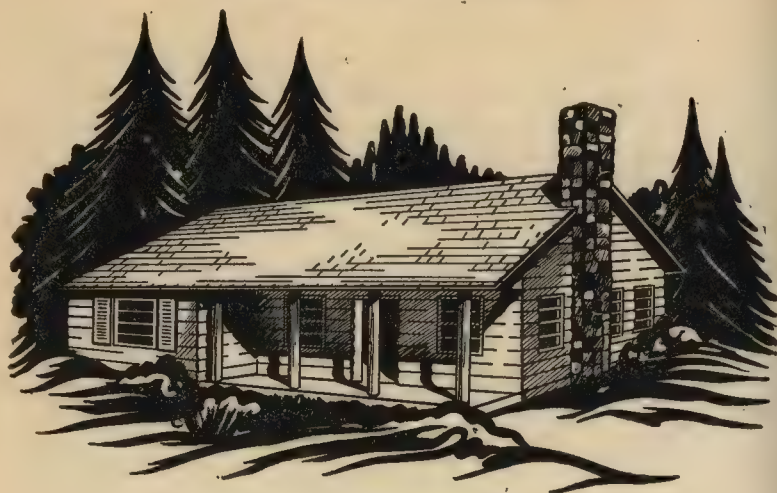
Today a "ranch house" usually means a home that is one story high, and that has such characteristics as a roof of low pitch; a porch or two, often long and narrow, with simple square posts from floor to ceiling; wide eaves, often with exposed rafter ends; walls of board-and-batten construction or covered with wide horizontal siding, shingles, stone, or brick; and frequently a patio or courtyard, and perhaps a breezeway. The plan is rambling, and a room could be added here or there without seriously affecting the general appearance . . . in precisely the way, no doubt, that the original ranch houses were enlarged. There may or may not be a basement: if there is not, one room will be devoted to a heating plant and other utilities normally basement-housed; or else, in a vacation home, a fireplace will constitute the heating plant.

One reason why ranch houses are popular is that they can look so informal and homey. And they are relatively easy to build, and do not involve climbing to dizzy heights to reach a gable end or the roof. Part of their charm comes from the rambling nature of the plan; but along with the charm may come the problem of how to get the house on a small plot of ground.

The ranch-house idea can be used for a simple forest retreat, a lake cottage or other summer home, a hunting lodge, grouped tourist cabins, tourist hotels, and so on. A one-room cabin can be given the ranch-house treatment as easily as a 10-room suburban or city residence.

If you are planning a ranch-type home for permanent occupancy in the suburbs or wherever else a relatively high level of building quality and appearance must be maintained, probably the best course to follow is to enlist the services of an architect. He can save you a lot of trouble

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Double porches, two bedrooms, and ample storage room grace this attractive ranch house. Attic can provide for additional bedrooms.

(Courtesy, California Redwood Association.)

and time, and in the end may save you more money than his fee totals. Besides, you will get a better-looking home. Even for the vacation home, no matter what its style, an architect's services often are worth-while.

In doing your own planning—which you will, even if you do consult an architect eventually—you can use existing houses and building plans as a guide. The requirements for

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each person or family are unique, so that a plan that satisfies one owner may be wholly wrong for another. So, with or without benefit of architect, you will have to arrange some details to fit your particular needs and those of your family . . . to base your plans on such factors as the kind of activities that will occupy you most when at home, or the hobbies that must be housed, or how many bedrooms you will need, and so on.

By making simple sketches of room layouts, omitting for the time being such refinements as doors, windows, and decorative details, you can begin to create some sort of order out of a jumble of ideas about a home plan. Redrawing the plan to provide different room or living-area arrangements will be easy. When you finally arrive at a scheme you will think will be satisfactory, you can make more elaborate plans which include such details as doors, windows, closets, dimensions, and built-in equipment.

A tendency in planning ranch houses and other present-day types is to arrange the room layout so the "front" or street side is used primarily for the entering and leaving of visitors, while the rear of the house is the real "living" part. Therefore the living and dining rooms, porches, and terraces are placed so they overlook a pleasing landscape, lake, garden, or other "view"; while the kitchen, one or more bedrooms, bathroom, and garage or carport entrance are at the front. The housewife working in the kitchen can keep an eye on front-door callers. The service entrance, if separate from others, can be either at the front or in a side easily reached from the roadway or drive. There should be a convenient way of carrying supplies directly to the kitchen from the car after it has been driven into the garage or parked beside the house.

An idea not at all new to builders of vacation cabins, hunting and fishing lodges, and lake cottages is being adopted generally in ranch-house planning. This idea is to think of

the entire house from the standpoint of living activities rather than from that of specialized rooms. The result is that even a small house can contain relatively large rooms each devoted to more than one activity, rather than being made up of a lot of one-purpose cubbyholes. Kitchens that contain eating facilities and easy chairs for loafing are regaining the popularity they enjoyed generations back. Living and dining areas are contained in a single room. A bedroom may, by day, serve as a sewing room, study, or other work area. In the larger ranch houses, a first-floor recreation room is popular; it can be converted into a guest room at night, simply by unfolding a bed or rearranging the cushions on a built-in sofa. This use of multi-purpose rooms makes a small house seem bigger, and is economical of materials as well as space.

Sometimes houses today are designed with the idea that the washing machine and other laundry equipment will be placed in the kitchen. While this may save space, it would seem unwise from a sanitation standpoint, for the handling of soiled clothes cannot help but release into the air dust that is laden with bacteria, fungus spores, and other filth . . . plus unappetizing odor. While no definite information about the health aspects of this practice is at hand, the custom strikes many persons as being a form of domestic uncleanliness that easily could be avoided by placing the laundry equipment in a utility room, special laundry room, or a corner of the garage. The ranch-type summer home often needs no indoor laundry facilities, for the washing, if any is required, can be done outdoors in fair weather.

The matter of basements, while it often does not concern the builder of a vacation retreat, does become important when the ranch house is to be used for year-round occupancy. Whether or not to have a basement seems to be largely a matter of personal taste and opinion. Some persons claim that a basement costs a lot more than it is worth,

while others say that there is virtually no difference between a basement house and a basementless one that must ramble enough to provide additional space comparable to the basement area.

A basementless vacation cabin can rest on piers or a cement-block or poured-concrete foundation extending below frost line, or on a concrete slab. In the case of a year-round country or suburban home, the slab or solid foundation construction should be used. Some characteristics of a basementless house: 1—Costs less than a basement type occupying the same ground area. 2—May cost as much as a basement type if made enough larger to provide additional ground-floor area equivalent to that of the basement. 3—Eliminates basement stairs and the work of climbing and descending them. 4—Special care must be taken to prevent ground moisture from seeping through the foundation slab or traveling into the walls. 5—Plumbing, if any, is covered by the concrete of a slab foundation, where it may be difficult to reach for repairing. 6—A slab foundation or one that consists of a wall extended merely below the frost line can be built more quickly than a basement can be excavated and walled.

Some characteristics of a basement house: 1—Cost of digging a cellar, walling it up, waterproofing the wall, installing a concrete floor, etc. is greater than the building of a simple foundation or concrete slab, for the same first-floor area. 2—A basement adds to the total time required to build the house. 3—Where ground area is limited, a basement adds to the usable enclosed space without increasing the area of ground covered by the building. 4—Basements can be built so they will remain dry, even in a wet location; and therefore they can be finished like the rest of the house. 5—A basement, being partly buried in the ground, is cooler in summer and warmer in winter than a similar room above ground. 6—Because of greater uniformity of temperature

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Here is a plan for a double-family summer cabin which can be converted into a spacious one-family ranch house.
(Courtesy, California Redwood Association.)

in a basement, people who follow photography as a hobby often prefer a basement location for a darkroom. 7—Similarly, a home workshop located in a basement will maintain temperature without sudden changes if windows are kept closed, and this makes it unlikely that tools will rust from moisture condensation.

A ranch house to be used mainly as a summer vacation

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retreat may need no heating facilities other than a stove on which to cook, and a fireplace for chilly evenings. Incidentally, although fireplaces are said to be losing some ground to television as a center of attraction in the home, they continue to be popular, and every ranch house should have at least one. For year-round occupancy, a basement house can use conventional heating equipment. When the house has no basement, space must be allotted on the first floor for a utility room which contains the heating plant and other equipment such as electric meters and main fuses, laundry facilities, and so on. A preferred position for the utility room, from a heating standpoint, is near the center of the house so that excessively long runs of pipe will be avoided.

Artificial heating generally is by fan-circulated air, steam, or hot water. Some use is being made of electrically-heated radiant panels consisting of resistance wire embedded in glass. These can be aimed so they make comfortable the occupants of a room or even an outside terrace, although the air temperature may remain relatively low. Such panels may act as supplements to the regular heating plant, and are useful on mildly chilly days when the main plant is not operating. Although steam and hot water systems may employ the conventional radiators, the newer radiant baseboards, which are essentially radiators encircling the room like a baseboard, may be preferable, and are said to produce good floor-to-ceiling uniformity of temperature.

Radiant heating is often mentioned and frequently used in connection with ranch houses. The pipes through which the heat-carrying fluid (usually hot water) circulates are embedded in floors and sometimes in ceilings. A house resting on a concrete slab or having a concrete floor can be heated by copper or wrought-iron pipes embedded in the concrete. The designing and installing of a successful radiant-heating system involves so many important factors that the home owner, unless he himself is a heating engineer, will be

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wise to enlist the services of a qualified expert in this field, or seek the advice of manufacturers of radiant-heating equipment.

One reason why ranch houses are so popular is that they make excellent use of relatively simple and sometimes less costly materials, with a minimum of frills. The board-and-batten wall construction, for example, is popular because of its pleasing appearance and its simplicity. Other suitable wall construction includes horizontal siding, vertical siding, plywood, shingles or shakes, concrete block, poured concrete, brick and stone veneer over masonry or frame walls, solid masonry walls of brick and stone, and stucco over concrete. Two or more of these wall types frequently are used in the same house to add interest and break up the monotony of rather extensive, rambling walls. Also, this practice makes it easy to add rooms later without worrying about whether or not the new walls will match the old ones.

One important characteristic of the ranch house is its low-pitch roof. Frequently this is gabled, although a hipped roof can be used. Shed roofs, which slope one way only, at a not very steep angle, and absolutely flat roofs are used, too—often in combination with a gable or hip roof. Whatever the style, the roof usually has considerable overhang at the eaves. It can be extended, as a solid roof or trellis, to regulate the falling of sunlight on walls and windows.

Because of high building costs, the practice of leaving interior walls unfinished, with rafters, studding, sheathing, etc. showing, has become widespread, even in year-round houses. (This, incidentally, is an old vacation-shack practice!) A house with a shed or flat roof lends itself especially well to this idea, for the roof sheathing can serve as a ceiling, with no excessive overhead room space. The single-pitch roof also is cheaper because there are no valleys, gables, and other irregularities to be installed and paid for. A flat roof imposes no limits on the extent and shape of the house,

and rooms can be built in any direction. When a gable roof, for instance, is used on a one-story house, the roof pitch limits the rooms as to size and the house as to general shape. But when a flat roof is used, it simply is extended in any direction to cover the rooms. If a single-story house with a low-pitch gable roof were to be enlarged indefinitely, the roof eventually would run into the ground at the eaves. But a flat-roof house, in theory at least, could be enlarged to cover many acres and could be any shape.

Breezeways are popular in ranch houses. Fundamentally, a breezeway is a covered walk between two parts of a house, usually the main portion and the garage. But in modern homes, it takes a variety of forms. A simple walk from house to garage is not a breezeway, for it adds nothing to the structural appearance. But put a roof, even a lattice-work arrangement of 1- or 2-in. boards, over it, and place a few posts or vertical lattice units along one or both sides of the walk, and you have a simple breezeway. Usually, as a common-sense protection from rain, a breezeway has a solid roof that blends with the rest of the house: if the house has two stories, the breezeway roof can be made flat to serve as an airing deck.

If one side of the breezeway is closed by a lattice, wire-cloth screens, glass panels, or a board-and-batten or other wall, and the other side left open or enclosed by screens, it becomes in effect a porch. The breezeway floor of concrete, brick, or stone can be extended beyond the roofed area to become a terrace. An outdoor fireplace can be installed under the breezeway roof, for hamburger grilling, etc. Closed on both sides by permanent walls, the breezeway becomes another room: a happy arrangement is to make one or both walls of movable panels, either sliding or hinged, which can be opened, as desired, for outdoor activities. Such a breezeway makes an ideal dining spot that can be used in

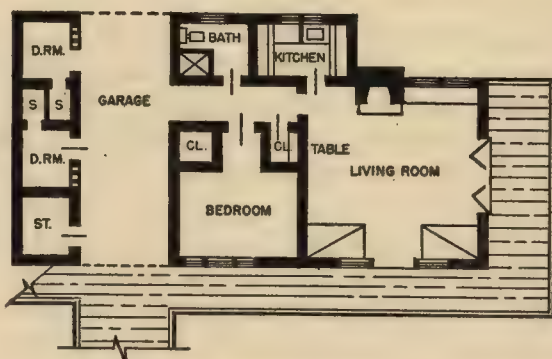
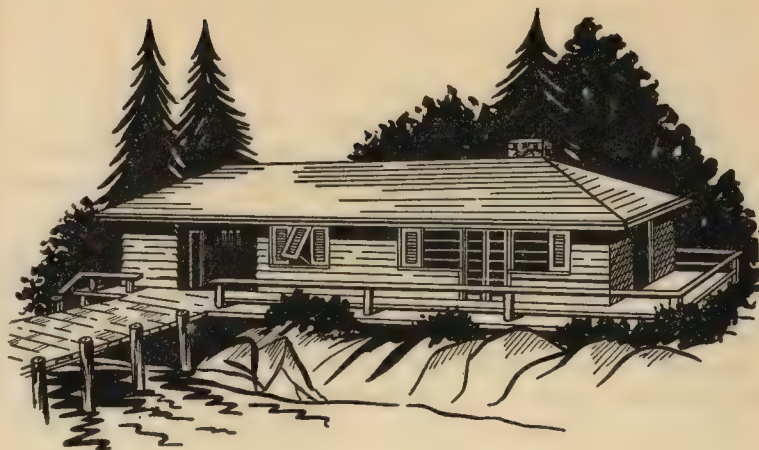
CABINS AND RANCH HOUSES

any kind of weather. Often a breezeway is provided with storage cabinets for garden and lawn tools, game equipment, and so on; and it sometimes makes an ideal place to store the winter's supply of fireplace wood. In fact, there are no visible limits to the ways in which this versatile part of a house can be used. If you are building a small ranch house which you intend to enlarge later, a simple breezeway can be a cheap and logical beginning for an added room: you start with the floor and roof, and add the side walls and interior equipment later. Also, a breezeway can be added to an existing house to serve as a unifying link between it and an annex.

The modern ranch house reflects the trend towards more and larger windows. Often there is a large picture window or a group of smaller windows in the dining room or living room wall. The primary purpose of such a window is to enable the occupants to enjoy the view; but too often a picture window is installed because it happens to be in style, and no thought is given to what can be seen through it. The result: you get an excellent view of your neighbor's garbage can or the side of his house . . . or of *his* picture window! So, when planning your house, do not include a picture window or window wall unless, by looking through it, you will behold a pleasing view of a lake, mountains, the countryside, or your garden. Fortunately, in the case of a vacation home, there usually is plenty of scenery for a picture window, and the main problem is the proper orientation of the house and the window for the best view.

The precise type and arrangement of windows will be determined largely by the particular style of ranch house you intend to build. The variety commonly considered as being a "true" ranch house generally has windows dimensioned and positioned so they conform to the low, horizontal lines of the building. Corner windows and low windows placed high in the room wall are common. Panes in multi-paned

THE RANCH-HOUSE IDEA



A novel feature of this lake or seashore cottage, designed by Richard Wheeler, is the drive-through garage, also a roadway to the adjacent boat dock. (*Courtesy, California Redwood Association.*)

sash are often wider than they are high, which is just a 90° switch from the typical colonial type of window. The picture window may be a single unbroken pane of glass or made up of smaller, horizontal panes proportioned to the overall shape of the window opening: the latter arrange-

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ment, when extending across one wall of the room, is often called a window wall.

But everyone does not like the typical "ranch-house" exterior appearance, and so there have developed certain variations which retain such ranch-house characteristics as the informal arrangement of living areas but possess a different architectural style. As an example, there is a combination that might be called a colonial or Cape Cod ranch house. Its exterior is largely colonial: a gable roof of somewhat steeper pitch, with perhaps enough space underneath for a second story. Windows placed more symmetrically than in most ranch houses, and being mostly higher than they are wide, and having multi-paned sash with the panes running vertically. Shutters flanking the windows and painted a neat blue, yellow, or other color to contrast with the white-painted exterior walls of horizontal siding. Inside, the house may have such colonial features as paneled walls of painted pine, corner china cupboards with Early American hardware, and a colonial fireplace; but it also follows the ranch-house idea of multi-purpose rooms, no basement, a rambling floor plan within the limits of the roof, and so on.

On the other hand, the ranch house can be extremely "modern" in style. The usual rambling room arrangement, multi-purpose areas, etc. are used, but the interior furnishing and decorating scheme is strictly contemporary. Glass brick may be used extensively. Exterior walls may be of brick laid neatly to form large masses, and the brickwork may be carried inside to form some of the interior walls. A chimney, of stone or brick, may be large enough to form an entire wall. Glass is often used lavishly, so that the living room or other area may seem to merge with the outdoors.

Another arrangement that has been used with pleasing results is a ranch-house cottage or permanent home of logs or log-cabin siding. Some of the outside walls are made of horizontal logs, while in others the logs (or siding) are

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placed vertically. Brick and stone or rough-surfaced boards can be worked into the scheme for variety. At one lake-shore resort, a small ranch-type pole house, with a large picture window and a shed roof, was painted a bright red, with white trim around the windows, etc.: and it is pleasing in appearance, even if a bit surprising at first sight.

Another factor in designing a ranch house for a summer retreat or for year-round living may be found in the owner's work or hobby. The boating enthusiast building his ranch house on the lake shore will, naturally, make provisions for carrying on his hobby. For instance, the house may be located on a slope so that the garage, actually on the upper floor, is reached from the street or roadway level, while the lower part extends over a dredged channel and becomes a boat house. One lake-shore dweller built his ranch house on a steep slope, making it in two sections connected by a breezeway. The breezeway is really a bridge, and beneath it the owner built a drive so that a car, in going to the nearby boat dock, actually passes under the house. The garage is on the lower level, beneath one of the house sections. One end of the house contains the living areas, the other, the sleeping quarters.

The man who is a home-workshop fan will, naturally, design his house so he has room for a well-equipped shop. A sloping lot, so the basement shop will have one side open to ground level, is convenient, especially when heavy equipment is being moved in or out. Even in a week-end cabin, a small workshop may be a valuable means of relaxing. Also, the amateur photographer will make sure there is space for a dark-room; and perhaps he will insist on a recreation room that can be converted into a studio. If the ranch-house owner is a horse fan, he probably will build a stable in the same style, and will enclose adjacent land areas with the flat-board fence typical of horse farms, or with an old-fashioned split-rail fence.

Chapter 19

RANCH-HOUSE CONSTRUCTION

MANY of the basic construction details of ranch-type houses do not differ from similar details in any other style. Careful workmanship, sound construction, and good-quality materials are just as important as ever. If the house is erected where a building code is in effect, the requirements of that code should, of course, be observed. Some of the important features of ranch houses are covered in this chapter.

FOUNDATIONS

A sound foundation will assure freedom from uneven and cracked walls, damp rooms, wet basements, and similar building flaws. Foundations suitable for ranch houses can be divided into four kinds: 1—Simple posts or piers of decay-resisting wood, stone, brick, or concrete. 2—Concrete slab. 3—Foundation wall extended below frost line and enclosing a first floor consisting either of a concrete slab or conventional floor construction supported by joists. 4—A wall enclosing a basement.

Piers—The small ranch house that is to serve as a summer cabin may rest on piers like those described for log cabins. It should be elevated enough above the ground (or water) to permit free circulation of air beneath it. But because a ranch house should merge with the ground for best appearance, a solid foundation wall usually is preferable.

Concrete Slab—In basementless construction, the house may rest on a concrete slab, which is essentially a large, flat

stone. For a small building where cost must be low and where severe freezing conditions are not encountered, a simple slab made like an overgrown sidewalk block may be adequate. It should be of sufficient thickness to bear the weight of the house, and should be reinforced with steel bars embedded in the concrete. The concrete for such a slab generally is poured over the prepared area, although it could be mixed on the spot and simply spread out evenly. Edges can be formed by boards placed on edge and braced with stakes, or by earth suitably banked.

The concrete slab can be made with a thick edge extending down below the frost line. This may mean a depth of 2 ft. or so, the edge or rim being perhaps 1 ft. wide at the bottom of the ditch in which it is formed, and increasing to 2 ft. or so where it joins the main slab.

There are several ways of preparing the area over which a slab will be cast. Simply tamping the soil to compact it may be enough. A 6-in. layer of gravel or cinders, well-compacted by tamping, is often used.

To prevent moisture from seeping up through the slab, even where the earth is considered "dry," it is necessary to provide a moisture-resistant barrier. This is a membrane which can consist of 30-lb. roofing felt or a tough, heavy-gauge paper over which hot tar or asphalt is brushed. This membrane, which should extend unbroken under the entire slab, is placed before the concrete is spread over it. Its purpose is to prevent ground moisture from seeping up through the concrete into the house, and it is one of the most important elements of slab-type foundations.

Foundation Walls—The foundation supporting the house consists of an 8- to 12-in. wall of concrete blocks, poured concrete, or perhaps tile, extending down to a footing placed below frost line. The footing at the bottom of the wall trench is made by pouring concrete into a wooden form or a cavity excavated in the earth. A groove 1 in. deep and 2

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in. or so wide along the top of the footing helps key the wall to it. For a small ranch house such as a two-room cabin, a footing 8 in. thick and 12 in. wide should be sufficient. For a larger house, the footing should be no less than 12 in. thick and 18 to 24 in. wide.

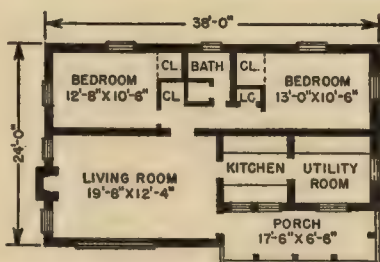
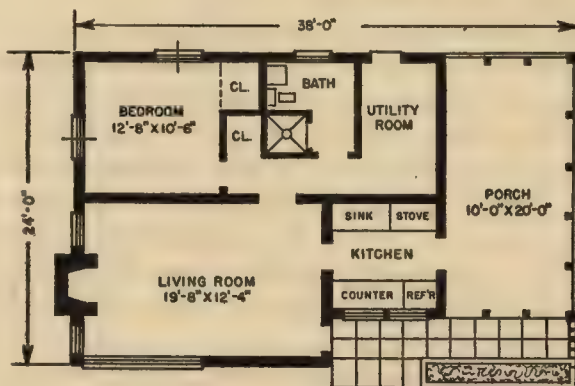
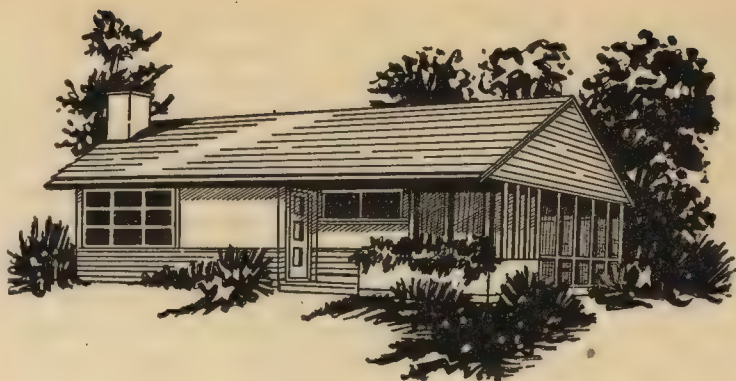
After the footing has set, a foundation wall 8 to 12 in. thick and made by laying up concrete blocks or by pouring concrete into forms, is centered over it, and extended above the ground surface. Clean the top of the footing well and spread mortar over it before laying blocks. The building walls are continued up from the foundation wall.

There are two ways of installing the building floor inside such a foundation: 1—Joists of wood, steel, or concrete are used to support a conventional floor or one made of concrete. Wooden joist ends rest on a plate of 2-in. lumber running along the foundation top. Between the ground and the joists there should be a crawl space of 2 ft. or so, and the foundation wall should contain ventilating openings screened to keep out animal life. In termite country, suitable sheet-metal shields should be placed all around the foundation and around any intervening piers.

2—A reinforced concrete slab is laid over a moisture-proof membrane directly on the compacted earth or a tamped gravel or cinder fill 6 in. thick. The membrane should be brought up the foundation wall to the level the floor surface will occupy, and may extend part-way over the foundation top. When a slab floor is used, sewers, water lines, etc. usually are installed before the foundation walls are built.

Sometimes the edges of this kind of floor slab are treated in the same manner as those of a conventional basement floor. The slab is cast so there will be a space 1 in. or so wide between it and the foundation wall, around the entire perimeter. Such a space is produced by installing oiled strips of wood to serve as forms: these can be lengths of beveled

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Designed for low cost and comfort, this summer cottage is erected by assembling pre-constructed wall panels, in the area served by the company that developed it. It can be built with a basic floor plan that includes one bedroom and a large porch, or an expanded plan including two bedrooms and a smaller porch. (Courtesy, The Housemart, Inc.)

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siding placed three-thick against the foundation wall, the center strip having its wider edge uppermost so it can be pulled out to release the others, after the concrete has set. Into the space thus produced, hot tar or asphalt is placed, to serve as both a moisture seal and a retarder of heat loss.

Basement Construction—A typical method is as follows: An adequate footing is made at the bottom of the cellar excavation, as described for foundation walls, and on it a concrete-block or poured-concrete wall 8 to 12 in. thick is built. There should be enough excavated space outside the wall to permit the installing of drain tile along the footer, and the application of waterproofing coats to the wall. The drain tile, which has open joints to admit water, is laid on a slight slope so that water will be conducted to some point away from the foundation. The outside surface of the basement wall is waterproofed by applying two $\frac{1}{4}$ -in.-thick coats of portland cement plaster, a not-too-wet mixture of 1 part portland cement and 3 parts sand. Or a tar-type waterproofing can be brushed on the walls. The space between the foundation and the earth, above the drain tile, is filled with a loose material such as gravel, through which water can pass easily.

The basement floor is about 4 in. thick, not necessarily reinforced, and its perimeter rests on the projecting top edge of the footing, with a tar-filled space between slab and wall. Maximum protection against seeping water results if waterproof membrane is used under basement floor slab.

A suitable concrete for foundation footings and walls and for floor slabs is a 1, $2\frac{1}{4}$, 3 mixture to which is added (when the sand is of average wetness) 5 gallons of water. (The foregoing mixture is produced by 1 sack of cement, $2\frac{1}{4}$ cu. ft. sand, and 3 cu. ft. gravel.)

HOUSE WALLS

Among the types of walls suitable for ranch houses are concrete block, poured concrete, wooden frame, solid ma-

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sonry brick or stone, brick or stone veneer over concrete, and brick or stone veneer over wood frame. A "veneer" wall is one that is built mainly for appearance, and does not support the building weight as do the other kinds. The house walls are supported by the foundation walls or by the perimeter of a concrete slab.

If concrete-block or poured-concrete walls are used, they are simply continuations of the basement wall or the wall surrounding a slab floor, and can be the same thickness—although for a small summer cabin, an above-the-ground wall thickness of 6 in. might be sufficient. Concrete-block walls should be laid carefully with plenty of mortar in the joints. A suitable mortar mixture is 1 part portland cement, 6 parts sand, and 1 part lime, by volume. Smooth outside mortar joints such as concave and V-type help prevent the wall from leaking. Concrete masonry walls can be finished with portland cement paint, which improves both the appearance and the water-tightness of the building.

Poured-concrete walls require wooden forms. Plywood intended for form-making is available, and it can be cleaned later and used for wall or roof sheathing or subflooring. It is braced by 2 x 4 lumber so pressure of the wet concrete will not cause the forms to spread or collapse. Concrete of a mixture such as 1 part cement, 2 $\frac{1}{4}$ parts sand, and 3 parts gravel is poured into the forms in amounts not to exceed about 10 in. depth at a time, and is well agitated with a shovel or paddle to eliminate air pockets.

If the house is of conventional frame construction, the sill boards should be fastened firmly to the foundation with large bolts, such as $\frac{3}{4}$ -in., whose heads are embedded in the foundation material to a depth of 1 ft. or so. At hardware stores, long threaded rods can be obtained and cut to length for making such bolts: their embedded ends can be bent to form a hook, to assure firm anchorage. Place a coat of thin cement mortar between sill and foundation.

Conventional wall framing consists of 2 x 4 in. studs set

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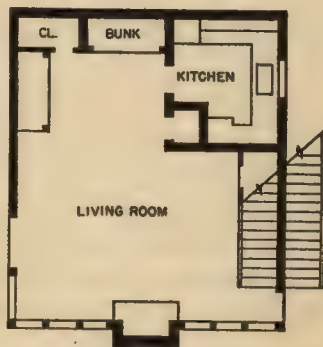
on 16-in. centers, with corner studs doubled or tripled. Lower ends rest on the sills and are nailed to them, and floor joists are spiked securely to the sides of the studs. Studs are topped by the plate made of double-thickness 2 x 4's placed flat. Above door and window openings, double 2 x 4's form the headers, and the lower parts of window openings are similarly framed.

In inexpensive cabin construction, the outer wall covering of plywood, siding, or boards and battens can be nailed directly to the framework; but for best construction, the frame should first be sheathed. For this, 1-in. boards placed horizontally or diagonally can be used, or special plywood or composition sheathing can be applied. The plywood may be that used for concrete forms. For maximum frame strength, especially when horizontal sheathing or no sheathing at all is used, diagonal braces should be installed at corners. These can be 1-in. boards set in notches cut in the two or three studs each crosses. Board-and-batten wall coverings, shingles, shakes, and similar types consisting of vertical members are readily applied to a sheathed wall; but when no sheathing is used, the frame must contain enough horizontal pieces to permit the shingles, etc. to be nailed securely. In the case of vertical boards, as the board-and-batten arrangement, ends are nailed to the sill and plate, and one or two horizontal 2 x 4 in. pieces between these two elements should be adequate.

Shingles used on walls are commonly 18 or 24 in. long and should be no wider than 9 in. An 18-in. shingle is placed with about 6½ in. exposed, and a 24-in. shingle, with 10 or 11 in. exposed. Shakes 36 in. long and 6 in. wide are placed with 12 to 16 in. exposed, and with 1 to 3 in. between edges. Use rust-proof nails for shingles, shakes, and preferably for all siding.

Brick and stone are often used for ranch-house walls, particularly the year-round type. If a veneer job is to be done,

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In areas where heavy snowfall blocks ground-level doorways, this cabin with a second-story entrance and steeply-pitched roof is definitely at home. In country where snow is not a problem, such a cabin could be a workable summer home for two families who share living and dining facilities jointly. (Courtesy, California Redwood Association.)

the load-bearing house walls, of frame or masonry construction, are set in on the foundation so a ledge is left to support the veneer. There should be an air space between the veneer wall and the main or back-up wall. Extending across

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this air space, to connect the two walls, are tie strips or clips made of corrugated sheet metal or heavy wire or rod. If the inner wall is of masonry construction, the clips are inserted as it is built; and likewise they are embedded in the joints as the veneer wall goes up. The tie strips may be placed in rows every 16 in. or so of wall height. When the main wall is of frame construction, it is sheathed and covered with waterproof building paper. Then clips are attached to the sheathing. If insulation in addition to that provided by the air space between veneer and the main wall is desired, the reflective type (aluminum-foil) can be applied to the outer (air-space) surface of the main wall.

A solid masonry wall has no air space between face and backing materials, and therefore has less heat-insulating effect. Such a wall should be at least 8 in. thick. The inside wall can be built of a porous concrete block that has good insulating properties. The two walls should be tied together at intervals.

Bolts should be embedded along the tops of masonry walls for anchoring the roof plate.

Fireplaces and chimneys should be built with their own footings and foundations, so their weight is not borne by the house foundation or walls.

Wooden wall finishing materials are available in considerable variety, and include, in addition to those already mentioned, plywood applied in various ways (See Chapter 12), and numerous varieties of siding. Any of the siding patterns currently available can be used. These include shiplap in several forms, drop siding, flush siding, rustic, log-cabin siding, and so on. Different effects can be produced by running these patterns in various ways or combinations of ways. Shingles can be placed in conventional patterns, or used to create novel effects in considerable quantity. By combining wide boards with relatively narrow moldings, usually with

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tongue-and-groove joints, still other designs can be produced.

When installing siding, it is good practice to paint the ends of the boards where they will butt against window, door, and corner trim; or, better still, prime the entire board on all edges and surfaces.

Window and door frames should be installed so air and dirt cannot enter around them. Weatherproofness is achieved by such devices as careful fitting, metal flashing above the frame, a rabbeted sill to receive edge of siding, caulking with a putty-like material around frame wherever air or water might enter, use of building paper between frame and outer trim and extending between adjacent weatherboarding and sheathing, and use of proper-fitting, weatherstripped sash.

ROOFS

The roof of a ranch house differs but little in basic construction from the types that have been used on various other buildings for generations. The slope of a multi-pitched roof is less on a typical ranch house than on, say, a typical Cape Cod style. But otherwise the construction may be the same—rafters notched to fit over wall plates and preferably spaced the same as studs, and ceiling joists similarly spaced and nailed to rafters. The roof should be fastened securely to the plates, which in turn are fastened to the walls. Rafters can be anchored with lag screws. Another way is to use anchor blocks cut from 2-in. lumber and nailed to rafters, plate, and joists.

Because a ranch house may contain relatively large roofed areas having no intermediate supporting columns or partitions, trussed rafters may be selected for supporting a gable or hip roof. A truss consists of two conventionally-positioned rafters whose outer ends are joined by a horizontal beam or joist. Running between this horizontal member

and the rafters are four braces whose arrangement is much like the letter "W." For maximum strength, joints are assembled with bolts and metal timber connectors. Specifications for trussed rafters of various spans are obtainable from such sources as the Southern Pine Association, New Orleans, Louisiana.

A low-pitched roof or a flat one must be built strong enough to support the maximum load of snow or water that is likely to be imposed. This usually means somewhat massive beams and proper spacing, plus intermediate support from partitions and posts. Sometimes a flat roof is built higher at the edges so it will hold an inch or so of water for summer cooling. It must, of course, be water-tight, a condition achieved by such treatments as the use of built-up roofing, which most local roofers are prepared to apply. A flat roof can be drained by a large down-pipe placed near its center and leading to a sewer.

Although wood shingles look perfectly at home on the ranch-house roof, they may be undesirable in some localities because of fire hazard or regulations. Fireproof shingles that resemble wooden ones are available. Whatever the shingle type, it is desirable to avoid too much order in laying. A roof pattern that is on the irregular, rustic side seems to fit the ranch-house idea best.

Wide roof overhang at eaves and gable ends is popular. Besides contributing to the low, rambling look, such overhang shields walls and wall openings from rain and sun, and may even shelter a walk running beside the house. If sufficient care is given to dimensioning the overhang on a southern or southerly side, it will prevent the sun from entering windows in that wall during the summer, but will not cut off the rays of the winter sun. As you know, the sun's rays strike the earth at a smaller angle in winter than in summer, in the northern hemisphere. You should be able to deter-

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mine the local sun angles from a nearby weather station, university, or public library . . . or by direct observation.

Instead of a solid roof, the overhang may consist of a trellis formed by combining 2- or 1-in. boards into a sort of lattice. If the boards are of correct width and position, they will serve as barriers to the rays of the sun but will not interfere with sky light or air circulation. A trellis is not a protection against rain unless it is roofed with glass or some other transparent or translucent material. A trellis may be more attractive than a solid roof, and the area under it is less gloomy than that under an opaque roof. The trellis idea often is extended to cover porches or terraces, and the trellis may act as a support for vines. Redwood and cypress are among the suitable trellis materials because they resist decay.

FLOORS

Floors of conventional construction are adequate for a ranch house, although the general theme of the building and the fact that it often is arranged so that outdoor and indoor activities are largely merged, has some effect on the choice of floor coverings. That is, the floor should be able to withstand considerable dirt and traffic. Asphalt tile, linoleum, hardwood, and painted concrete are satisfactory, especially for the summer- or beach-type ranch house. Carpeting or matting also can be used when desired.

If the floor is a concrete slab, no covering is likely to be satisfactory unless the concrete remains free of moisture. That is where the water-resistant membrane mentioned in connection with foundations proves its worth. A slab resting on the ground and with no water barrier under it is likely to transfer so much moisture to the house that carpets decay and cemented coverings loosen and buckle. Wood finish flooring, linoleum, and asphalt and similar tile can be laid directly over concrete that is free of oil, grease, and

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other dirt. A paper felt can be used under linoleum. Wooden floor boards can be nailed directly to a concrete floor topped with a special nailing concrete. Or the boards can be nailed to wooden sleepers spaced like ordinary wooden joists. The sleepers, 1 to 2 in. thick and around 4 in. wide, can simply be laid on the concrete floor or fastened to it with a tarry cement or with concrete-penetrating nails (or both cemented and nailed). The spaces between sleepers are usually filled with something, such as fine cinders or pellet insulation, to deaden sound and decrease heat loss. For a recreation room, dining room, hall, or similar area, a floor consisting of slate or stone slabs over concrete is interesting and durable. When carpet is to be used over a concrete floor, a felt pad is first installed, and a wooden tacking strip is placed so the carpet edge can be fastened to it.

A type of flooring particularly suitable for the ranch house is a replica of the pegged, random-width floor boards used generations ago.

For finishing wooden floors, shellac applied in several thin coats is said to be among the most satisfactory materials.

TERRACES

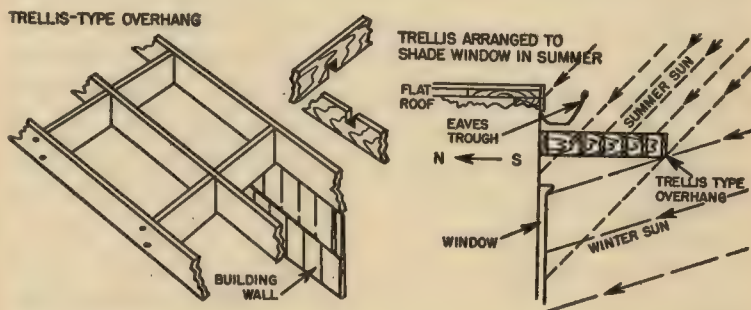
One of the most enjoyable features of a vacation home, whether it be ranch house or other type, is a terrace where you can enjoy the sun or loaf in the shade of a nearby tree, awning, or the house itself. A terrace is merely an area leveled and paved with some durable material, and perhaps provided with an overhead trellis, awning, or permanent roof. Solid concrete; concrete blocks or bricks laid in a suitable, often novel, pattern and the spaces between them filled with clean sand or cement mortar; cypress or redwood blocks or tree sections placed with end grain uppermost; flat stones with grass growing between them—these are among the popular kinds of terrace paving. A small ranch house may have a terrace extending all around it, wider in some spots than others, so that

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a suitably shady or sunny spot can be found at any time without the necessity of walking across a lawn.

WINDOWS

The trend in building ranch houses and various other types is toward the use of more window area. Modern storm sash and insulating panes make this feasible. Windows often are grouped, both to provide larger views of a desirable scene and to leave wall spaces for furniture arrangement or built-



This trellis-type overhang shades the window in the summer, and can be covered with glass to provide rain protection.

ins. Often all of the windows in a room will be in two walls where they meet to form a corner. The framing for such corner windows involves doubled 2-in. boards all around, plus the use of a wood or steel post at the corner: the post is later concealed by the outside wall finish or trim. Short windows, sometimes only a foot or so high, placed near the ceiling are used in walls where maximum privacy and protection against intruders are desired. Such windows do not interfere with the placing of room furniture.

When a large window consists mainly or entirely of a single pane of glass, it becomes a "picture window." Usually such panes are of double or triple thickness with intervening

air exhausted, so they do not transmit heat, or steam in winter. Such a pane, because of its size and weight, is fixed in position. Ventilation is provided by conventional double-hung sash or casements on either side, or by louvered ventilating openings above or below the fixed pane. The louvered ventilators (or they may be conventional screened openings like basement windows) are closed by hinged or sliding plywood panels.

When several windows are installed side by side, they produce a window wall, which serves the same purpose as a one-piece picture window. Still the most popular for such groupings seems to be the familiar double-hung window, although casement types are used, too. Modern double-hung windows are superior to their ancestors. For instance, there are types whose sash can be unhooked and swung inward like a casement, for cleaning. Storm sash and screen units are engineered to fit efficiently and with a minimum of effort involved in changing them.

Sometimes a large window is dressed up by installing over it, on the inside, a lattice arrangement of vertical and horizontal boards. Thus, 1 x 6 in. boards arranged to form 2 x 2 ft. squares might be used. The horizontal boards form shelves for holding decorative glassware or flowers. The lattice, finished to match the rest of the room, can serve as a brace for a large pane which might be bowed in by pressure from a high wind. Large windows made up of numerous relatively small panes separated by conventional mullions should be no more subject to wind-pressure damage than the same window area scattered in the form of small individual windows. The problem of wind damage to a very large area of glass is one that can be answered by consultation with a local plate-glass company. Special braces are sometimes used on large store windows to limit their flexing under wind pressure.

Picture windows and window walls should be designed in conjunction with the planning of roof overhangs or trellises

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to regulate sunshine through them. Horizontally-sliding curtains are commonly used to cover large windows at night and to regulate daytime light through them. An adjustable outside curtain or jalousie (adjustable shutter resembling a venetian blind) will be more effective than an inside one for keeping the sun's heat from entering a room through a window that is not shaded in summer. In winter, such heat helps reduce the fuel bill.

DECORATIVE DETAILS

A typical ranch house depends on interesting wall and roof textures and good proportions to make it attractive, and in the interests of economy, purely decorative details often are omitted. However, a little touch of something that is more attractive than useful is often worth while. One ranch-house builder habitually uses a small cupola to dress up his homes. This is placed on the garage roof in most cases, and in size and shape is in harmony with the rest of the house. Other builders depend on a somewhat fancy entrance arrangement, perhaps an arch of cut sandstone, or a wall area of natural-finish, varnished boards near the entrance door. The door itself may be made the center of interest by making it oversize, by providing it with an attractive arch, painting it some bright color, using an interesting scheme of paneling, or by using Dutch doors. Your architect should have many ideas for the little decorative touches that will make your ranch house stand apart from the commonplace. For the woodland ranch-house retreat, the decoration should be somewhat rustic in nature . . . maybe a set of deer or moose antlers mounted over the front door!

OUTSIDE FINISHES

Stone and brick require, in most cases, no additional finishing, other than cleaning off excess mortar that has spattered on them. Dilute muriatic acid is used for removing

mortar spots. Brick walls sometimes are painted to produce special effects. One house builder acquired a quantity of paving brick and used them instead of the regular wall-building kind. He gave the finished walls a generous application of whitewash, and let the excess weather off. The white coloring remaining in crevices and joints produces a charming aged effect and effectively disguises the nature of the brick.

Shingles and shakes are commonly finished with a commercial shingle stain. It has been said that ordinary house paint may cause them to rot by imprisoning moisture. Ready-stained shingles are available, and should require no additional finishing for some years. Walls covered with siding are usually painted, although they can be stained a brown or similar hue appropriate for a woodland setting. Board-and-batten and similar walls are either painted or stained, depending on the overall color scheme of the house. A stained wall of this sort is often used to break the monotony of painted siding. The stain may be a type requiring no further finish.

An increasingly popular way to finish outside walls, particularly those composed of siding placed vertically on gable ends etc., is to stain them a light straw or similar color and then give them two coats of spar varnish or apply a special clear wood-finishing preparation called, by some manufacturers, an "oil."

Concrete-block and poured-concrete walls are usually finished by applying portland-cement paint of the desired color, which increases the wall's resistance to water, in addition to producing a smoother, colored surface; or by applying stucco of the desired color and texture.

And, of course, ranch-house walls of wood are frequently protected by painting. The color gamut may range from white to something like barn red. In a woodland setting such as that occupied by the typical vacation cabin, a brown or a

green would seem most appropriate; while for the lake or seashore cabin, white or some light color would be fitting. For a good paint job, no matter what the color or style of wall, the wood should be thoroughly seasoned and dry. The first paint coat is thinned according to the manufacturer's instructions—for example, by 1 pint of turpentine to a gallon of paint. The second coat of a three-coat job is similarly thinned, and the final coat applied without thinning.

INTERIOR FINISHING

There are countless ways of finishing the interior. Usually the color scheme is in keeping with the general theme of the house, or with the type of furnishings used. Exposed frame members and sheathing can be stained and given two coats of white or orange shellac; or they can be painted white or any color desired, a non-gloss enamel being suitable. Redwood and some other woods are often left in their natural color, and simply given two coats of clear shellac, and then waxed; or treated with a clear penetrating wood finish or with varnish.

An interesting finish that can be made to match practically any color scheme is produced on such woods as knotty pine by using a paint glaze. First apply a coat of well-thinned shellac to the wood to act as a sealer. Thin paint or enamel with turpentine until it is about like that used for priming new wood, or even slightly thinner. You can use white paint, and tint it with oil pigments to the color desired. Brush the thinned paint evenly over the wood, then before it has a chance to dry, wipe off most of it with a cloth. This removes the pigment from the high spots, leaves it deposited in crevices, grain pores, and cracks around knots. You will find that, by careful wiping away of the pigment, you can produce different effects. Another way, particularly suited for areas containing molded or carved details, is to apply an

even ground coat of antique white enamel, then when it has dried apply over it a coat of thinned paint of some color such as brown. Wipe away most of the second coat, leaving the color in cracks, low spots, etc. An attractive "antique" effect can thus be developed. When the glaze has dried thoroughly, apply two or three coats of fairly thin shellac, sanding the final one with fine-grit paper or rubbing it with fine steel wool. Finally, give the wood a coat or two of wax or a non-gloss varnish.

There are countless novel finishes that can be used on interior walls of plywood, plaster, various wallboards, and concrete. One decorator, for instance, produced an interesting wall covering by weaving strips of furniture webbing into a checkerboard pattern, using tacks to fasten the strips to the wall. Scenic wallpapers with a Western motif blend well with the ranch-house idea: such paper is available for producing pictures of various sizes that will cover an entire wall with a single scene, like a large painting. A similar but perhaps more costly effect is achieved by mounting huge photo enlargements on interior walls. You can have a photo-mural made from your own negative, showing some favorite fishing spot, picturesque seashore view, or something else of interest to you and your family and guests. Photo murals, which are obtainable from companies specializing in that type of photography, should be protected by clear lacquer.

Sawmill slabs, split poles, or log-cabin siding can be used to produce a rustic atmosphere in recreation or other rooms of a vacation ranch home. These can be arranged horizontally, vertically, or diagonally. Usually they are given a "natural" finish with clear shellac, varnish, etc.

Additional information, plans for large and small houses, estimates of cost, and the names of competent contractors and architects usually can be obtained from your local lumber dealer.

Chapter 20

PROFIT-MAKING TOURIST HOMES

THE tourist cabin is here to stay, at least until something better comes along. Often stopping at a cabin costs less than at a hotel; but even if there is no advantage in rates, many a motorist prefers the cabin because he can keep his car nearby, and he avoids the tips, formalities, and other modern inconveniences often involved in stopping at a hotel for the night. Building a tourist cabin is not fundamentally different from building any other cabin or related structure. In fact, the tourist-cabin industry seems to account for a large percentage of the log cabins erected in recent years.

The man who is a professional cabin builder should find the creation of tourist camps a profitable business. One who becomes a specialist in the construction of cabins, and the related bath houses, toilets, store buildings, service stations, and community kitchens, should have little trouble keeping busy. The farmer or other land owner whose property adjoins a busy highway will find a cabin camp a source of extra income during many months of the year. Two persons can take care of 24 cabins, a gasoline station, and a store. A small night camp might easily be a spare-time proposition, requiring attention only in the morning and evening.

The essential requirement of a site for a tourist cabin is that it be on a highway. A close second in the matter of requirements is the presence of trees. Good drainage is, of course, necessary. There must be a source of pure drinking water and a sanitary way of disposing of sewage and gar-

CABINS AND RANCH HOUSES

bage—matters usually watched by the local health board. The presence of an attractive stream is a decided asset.

Many owners of tourist camps start with two or three cabins, and then add more as business improves. In this way their starting investment is kept at a low figure. A filling station, store and refreshment stand, centralized bath house, and a picnic grove will add to the profits.

Tourist cabins are not expensive structures. Being small, they can be built of short-length lumber that can be purchased more cheaply than standard lengths. The average tourist home is about 12 ft. wide and from 12 to 16 ft. long. Its windows are equipped with sash that can be opened, and fitted with screens to keep out insects. Likewise, there is a screen door. Windows and doors should be equipped with locks that can be operated without the aid of a kit of tools.

Many motorists prefer cabins that have attached car sheds. The shed can be open or enclosed, although most motorists probably would take the enclosed type if they had their choice. The shed frequently is a continuation of the roof, and in size should be about 11 ft. wide and 20 or 22 ft. long. An economical plan is to build twin cabins with a two-car shed between them, the car compartments being separated by a solid partition.

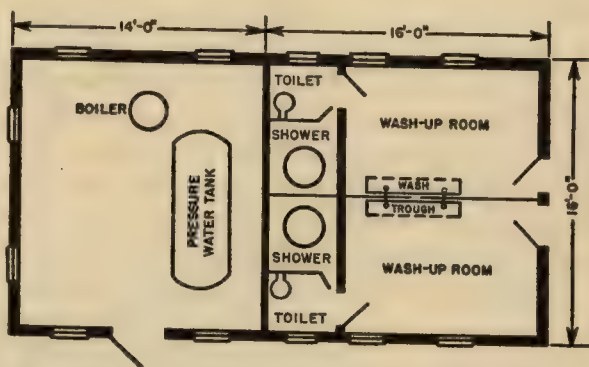
There are endless designs for tourist cabins. Commonly the framed-building construction is followed. Frames are built of 2- by 4-in. studs and rafters and 2- by 6-in. joists, covered with ordinary weatherboarding and roofed with composition shingles or roll materials. However, it is a good idea to avoid too conventional construction and attempt to produce something really distinctive.

For example, there is a "California type" of tourist cabin designed by Masten and Hurd for the California Redwood Association. It looks more like a comfortable week-end cottage or hunting lodge than a tourist home. The walls are of board-and-batten construction supported on a framework of

PROFIT-MAKING TOURIST HOMES



A colony of tourist homes will be more attractive to the weary motorist if it contains a bath house such as this one. Adequate sanitation and compliance with local health regulations are but common sense.



Floor plan of bath house that is extremely economical to build.
(Courtesy, Long-Bell Lumber Co.)

2 by 4's. Sills rest on redwood-post footings, and the gable roof is covered with split shakes of the same material. The car shed is partly concealed by an attractive trellis on which a vine grows. Bandsawed verge boards, a well-balanced chimney, and shutters add to the attractiveness. The cabin contains a main room, a kitchenette, and a tiny bathroom. It measures 13 ft. 9 in. by 14 ft. at the sills, and the car

CABINS AND RANCH HOUSES

shelter, which also can serve as a porch, should be about 11 ft. wide and, for the largest cars and station wagons, should extend somewhat beyond the length of the cabin, say to 20 ft.

Painting is an important item of appearance. For the cabin just described, the following painting plan has been worked out: Roof shakes, left to weather naturally. Shutters and outside sash, stained green. Lattice of trellis, green. All other outside woodwork, whitewashed two coats. The interior is, for the most part, left in natural redwood. The floor is painted a dark green. Kitchen and bath are given three coats of interior wall paint.

Whether the interior of a tourist cabin is ceiled or otherwise covered is a matter for the owner to decide. A ceiled job is usually preferable because considerable tourist traffic exists in early spring and late fall, when nights are chilly. Nothing will drive customers away more quickly than news that "the cabin was like an ice box." To reduce further the ice-box trend of a tourist cabin, apply building paper beneath the siding. Shingled sidewalls, because they are somewhat more efficient as heat insulators, will make a cabin cooler in hot weather and warmer in cold than most other types. Roof and wall insulation may be a good investment.

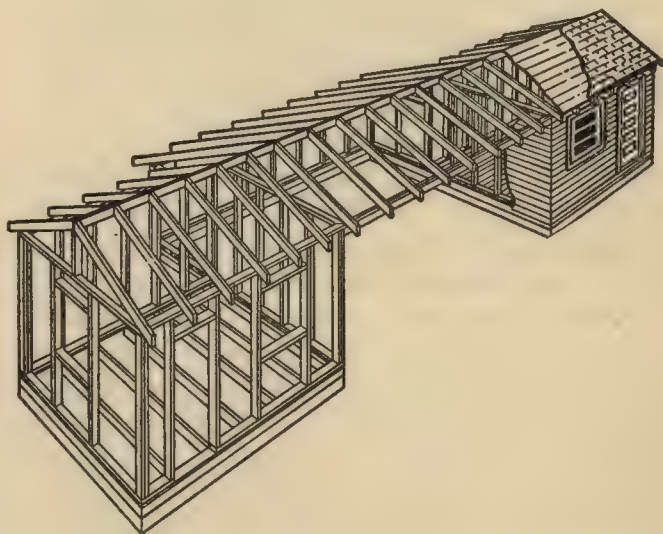
Builders and operators of tourist cabins generally do not recommend the use of plaster or any of the composition finishing materials for the interior walls. They say that wood is better because it will stand the knocks and bangs that the cabin is certain to receive from tourists. Incidentally, a cabin that is attractively finished is likely to receive better treatment than one that is not.

Cabins are built with either flat or gable roofs. Of the two, the flat one is the least desirable because it does not drain water rapidly and therefore may leak, and because it is hotter in summer. Also there may be some instances where a flat-roofed cabin would be damaged by heavy snowfall.

PROFIT-MAKING TOURIST HOMES



This cabin is designed for the use of two families. The wings are separated by a two-car garage. (*Courtesy, Long-Bell Lumber Co.*)



Detailed drawing showing the manner of building the two-family cabin.

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The gable or hip roof is more expensive to build but less expensive to keep up. Also, the air imprisoned beneath it acts as a heat barrier and makes the cabin cooler. Any type of roof covering may be used, but it should be attractive. Wood shingles and shakes are popular.

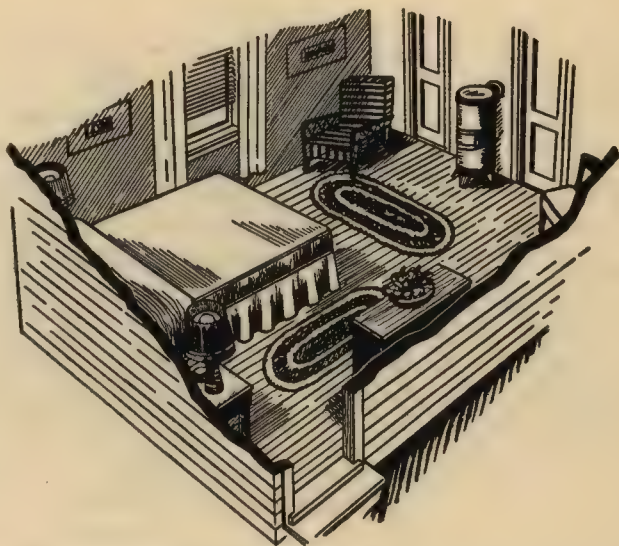
The cabin stove probably will burn coal or wood, although in some localities natural gas or central heating is available. For any cabin stove, a chimney is necessary. The recommendations made in the chapter on chimneys and fire places can be applied, with the exception that the chimney, being small, can be supported on a well-braced shelf extending out from the cabin wall. Precautions to prevent overheated wood should be taken. It is wise to follow suggestions made by a fire insurance company or other interested agency.

Next to a place to eat and sleep, the average motorist needs and desires a place to take a bath. There should be no need to state that bathing facilities should be sanitary. Whether each cabin has a bath or a centralized bath house is employed is a matter for the camp owner to decide. Centralized bath houses are seen frequently, probably because they are easier to care for and more economical to operate.

Such a bath house has been described by a lumber company that has made a study of the tourist-cabin situation. The house, as the floor plan indicates, (See p. 223) consists of three compartments. One is the men's room and the second is for women. The third is the boiler room containing fuel bin, a pressure water tank and heater. In each of the wash rooms are wash basins capable of accommodating several persons. At one end of the room is a toilet and next to it a shower compartment. The building is of conventional frame construction, covered on the outside walls with 1-by 12-in. barn boards placed vertically. Shingles are used on the gable roof and composition roofing on the flat roof over the boiler room. The gable construction could be extended to cover the boiler section, without much additional cost.

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A common mistake in providing public rest-room facilities is to make the toilet stall too small. There should be ample room for arranging clothing, two or three hooks on which to hang coats, etc., and a small shelf where a purse or other article can be laid. And, on the door, there should be a sign: "Have You Forgotten Your Purse or Package?"



Interior view showing minimum furnishings a tourist home should contain if it is to prove attractive to guests.

In addition to the types of tourist cabins already mentioned, the possibilities offered by real logs and log siding are limitless. When there are two or three dozen such cabins, as would be the case of a fair-sized camp, the effect is the more marked and permanent. Of course, other things such as cleanliness, comfortable beds, and adequate bathing facilities must be provided. But the mere appearance of a log structure is of great advertising value.

Chapter 21

ROADSIDE STANDS AND STRUCTURES

AN INDUSTRY of astonishing proportions is strung out along the highways of the United States. This industry's purpose is to sell things and disseminate comfort and information to the passing motorist. Its visible plants include roadside lunch stands, gasoline stations, farm produce stands, signboards, comfort stations for tourists, ice houses, barbecue stands, dancing pavilions, ice-cream stands, popcorn booths, novelty, antique, or pottery stores, and salesrooms for flowers and shrubs.

Whether you build a roadside stand for yourself or for someone else who is willing to pay you for your efforts, you will find it worth while to apply many of the ideas contained in other chapters of this book. Of all the possible forms that a roadside stand may take, that involving the use of real logs or log siding is particularly desirable.

A gasoline station, lunch room or other sales center built of real logs is almost certain to stand out from every other similar place in the vicinity, and perhaps along the entire highway. There is something about a real log structure that commands attention and makes a lasting impression.

The development of log-cabin siding has opened an immense field to the builders of roadside stands. When properly used, such material is as distinctive as real logs, and in many localities is much cheaper.

Of course, roadside stands can be built of conventional material such as ordinary siding nailed over a wooden frame. Such places can be made extremely attractive and

ROADSIDE STANDS AND STRUCTURES

distinctive. However, the fact remains that there are more ordinary frame shacks along our highways than attractive buildings of logs or some other materials; and ordinary things seldom attract attention.

By making a few simple changes, many one-room cabins, designed primarily for recreational purposes, can be con-



This simple cabin, designed primarily as a vacation retreat, can be converted easily into a wayside stand or store.

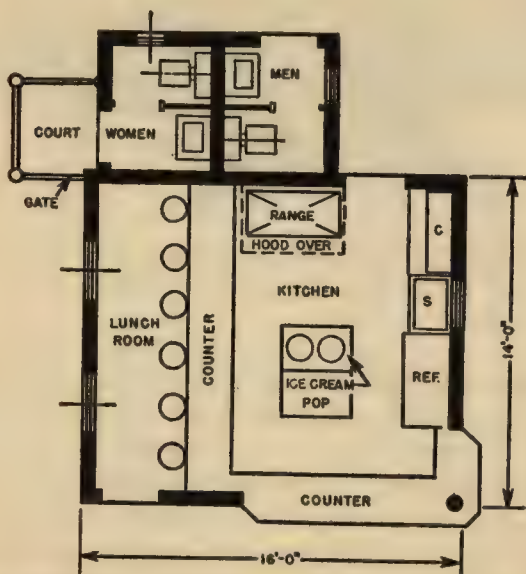
(Courtesy, Shevlin Pine Sales Co.)

verted into practical roadside lunch stands. For instance, here is a 14- by 21½-ft. cabin designed by Louis Boynton Bersback, Minneapolis, Minn., architect, for the Shevlin Pine Sales Company. You will note that there are two windows and a door in the front. To convert this cabin into a roadside lunch stand, all that is necessary is to take out the windows and build a counter that will project out from the wall. Another way would be to build a porchlike arrange-

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A combination lunchstand and lunchroom which will attract customers because of its pleasing design and prominent rest rooms.
(Courtesy, Northwestern Lumberman's Association)



Floor plan of the lunchroom shown in the preceding illustration.

ROADSIDE STANDS AND STRUCTURES

ment in one of the front corners and erect a counter around it. This opening would extend about halfway across the front, so that the entrance door could be set in the remaining wall area. This door would lead to an inside lunch counter large enough to seat 6 or 8 customers. Serving both the inside and outside counters is a compact kitchen including a range, soda-fountain equipment, and other usual lunch-



This unusually attractive building is constructed of pine log siding. It is suitable for a roadside antique shop or other enterprise.

(Courtesy, Shewlin Pine Sales Co.)

room devices. The cabin roof should be extended somewhat at the eaves so that it forms a shelter for the outside lunch counter.

A highly desirable part of any roadside stand is a section devoted to rest rooms for men and women. These can be made a part of the main structure, or set at some distance from it. In either case, they should be properly designed from a sanitary standpoint. Log siding and similar materials

CABINS AND RANCH HOUSES

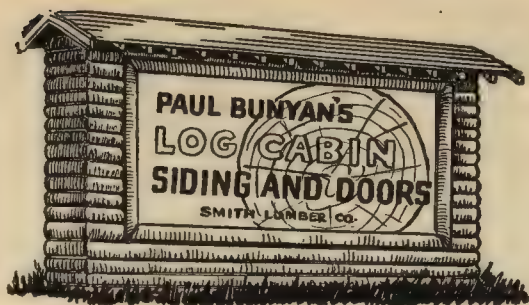
are particularly adapted for such structures. Providing of rest-room facilities is more than an act of kindness towards motorists. It is sound business, for the traveler who makes a comfort stop is likely to purchase a few ice-cream cones or several full meals, depending on the time of day and the attractiveness of the stand.



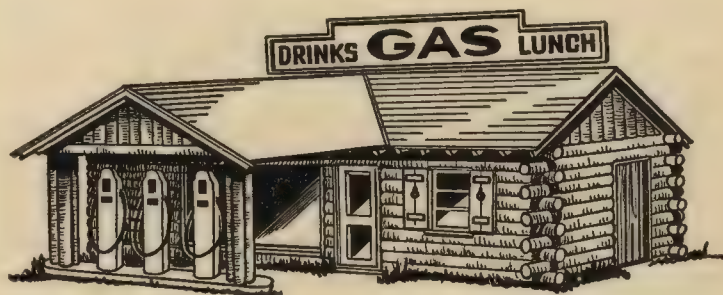
A pine log siding ice station that is a great convenience near a tourist camp. (Courtesy, Shewlin Pine Sales Co.)

It is customary for farmers whose land lies along a roadway to erect stands at which to sell garden produce and other farm products. Competition in this field is keen, so the attractiveness of stands is of prime importance and value. A simple roadside produce market can consist of nothing more than a boxlike counter surmounted by a sheltering roof. Because the merchandise usually is removed from the stand at night, a permanently open structure can be used. Of course, if desirable, a small cabinlike building

ROADSIDE STANDS AND STRUCTURES



Even a sign board can be made attractive. This one is made of a product it advertises. (*Courtesy, Red River Lumber Co.*)



A log-cabin gas station is largely self-advertising because it is attractive, and is particularly appropriate in wooded areas. (*Courtesy, Red River Lumber Co.*)

with a front opening surmounted by a hinged roof that can be swung down at night, can be employed. The shapes and sizes of roadside produce stands vary widely. Pleasing proportions are desirable, and freakish construction should be avoided. Often a plan for a full-sized cabin can be reduced by one third or one half, to produce an attractive stand. Log-cabin siding is particularly adaptable to such designs, although real logs, shakes, shingles, or ordinary weatherboarding can be employed as well.

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If you are establishing a roadside stand for the sale of farm produce or other commodity, do not make the common mistake of placing it where a passing motorist cannot stop without endangering his life. Too many stand operators fail to provide a generous pull-out or parking area, and as a consequence, many potential sales go sailing by! Also, if you erect roadside signs advertising your business, place them far enough down the road, and use letters of sufficient size, so the fast-traveling motorist can read them and then have time to slow down before he reaches the stand.

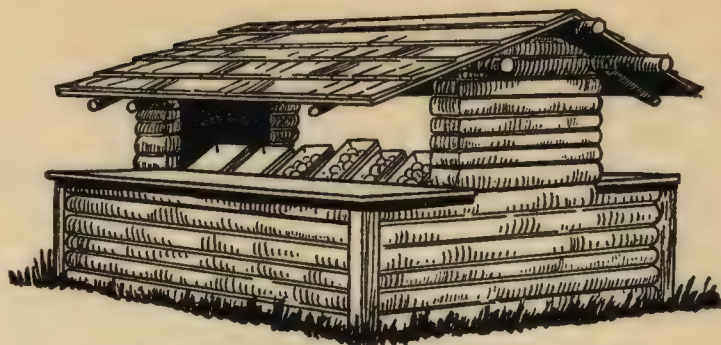
One of the greatest advantages in using real logs or log siding is that these materials do not have to be painted or otherwise protected from the weather. This reduces upkeep costs. Such structures always look in good shape, even after years of exposure. By their very nature, they are supposed to be weatherbeaten.

Barbecue stands are constructed exactly like any cabin or other lunch stand, provision of course being made for the serving of sandwiches, refreshments, and full meals to customers. Such buildings generally are of fair size, and sometimes contain small dance floors. Log cabin construction methods are flexible enough to permit the erection of buildings of any size.

Gasoline stations present no problems to the person familiar with cabin building. A gasoline station often is of the same general design as a tourist cabin or small vacation cabin, so the plans given elsewhere in this book may be adapted.

The owner of a chain of lunch stands, filling stations, or other commercial enterprise will find it profitable to standardize on one distinctive type of construction. He might operate the "Log Cabin Wayside Stores," or a series of "Shingled Shanties" for the dispensing of soft drinks. Once a motorist becomes familiar with one of the units of such a

ROADSIDE STANDS AND STRUCTURES



This attractive roadside produce stand is made of log-cabin siding and has a harmonizing roof of wood shingles.

chain, he will recognize others instantly, and immediately feel that he is meeting an old friend.

An architect who was called upon to produce plans for an inexpensive yet attractive town hall specified pine-log siding set vertically and painted white, to produce a modernistic appearance. The job, when completed, lived up to all expectations, indicating that building materials primarily intended for rustic projects can be turned to modern purposes.

This scheme could be adapted to the roadside stand with gratifying results, provided the design was well worked out. For the small structure, narrow, round-log siding probably would be most suitable. Simply by varying the fundamental design and finish, a structure resembling a pole house or a modernistic building can be produced.

Chapter 22

SUMMER HOMES IN NATIONAL FORESTS

WHERE to build? Sometimes this is the biggest problem the prospective cabin owner has to solve. If there is a national forest within reach, the answer often may be found without much trouble.

National forests are government-owned forests set aside and administered for the protection, management and use of timber, water, range, recreation, wildlife, and all other resources in such a manner as is in the public interest. Recreation use is one of the major national forest resources, and a summer home is one way to enjoy the recreation opportunities of a national forest.

Summer homes are a private use of national forest land, and therefore are only permitted on areas which are not suitable for, or not needed for, public uses such as camp grounds, picnic areas, organization camps, resorts, ski areas, etc., which have higher priority because they are open to all people. There are, however, many areas available for summer homes throughout the national forests which can be so used without interfering with public uses. In some localities, the demand exceeds the available lots and there are waiting lists; while in other forests, lots are available immediately.

Suppose, for example, that you are traveling through one of the national forests, and have come upon an area set aside by the United States Forest Service for the erection of summer homes. You like the looks of the place, and decide that you want to build a summer cabin there. Inquiry reveals that you must get a summer-home permit.

SUMMER HOMES IN NATIONAL FORESTS

This is a written permit for you to build a cabin on a specified lot of government property set aside for the purpose. You cannot buy the land, but you can lease it for cabin-building purposes. These special-use permits are granted for an indefinite period, or for a definite term. Rentals for summer-home sites run from \$20 to \$50 per year, with the average about \$30. Payments are due the first of each year. The usual summer-home lot is $\frac{1}{2}$ acre in size, but the Forest Service leaves ample space around lots so that the "feeling" of the forest is preserved.

Having selected a place where you would like to build a cabin, you can make application for the necessary permit, to a forest ranger or any forest officer. The best plan is to apply to the proper forest supervisor, addressing your request to the supervisor's headquarters; or you can obtain general information about forest-home sites from the Regional Forester, at the address given later in this chapter. Application blanks are not necessary for making summer-home site applications.

The regulations you will have to obey in connection with your cabin project are not stringent. They are imposed merely for the purpose of assuring safety and enjoyment to all who use the forest as a recreation place. There is some control over the type of cabin you may build. This is for the purpose of preventing shanties and gaudy structures that would be entirely out of keeping with the spirit of the forest.

For this reason, your building plans must be approved by the Forest Service before you may go ahead with the construction. Such things as appearance, fire menace, and sanitation are considered. The buildings themselves must be substantial, with well-designed doors, windows, floors, roofs, masonry, or brick chimneys. Fly-proof toilets and sanitary garbage containers must be provided. Strict rules are enforced in connection with location of toilet and water

CABINS AND RANCH HOUSES

sources. No toilet is allowed closer than 100 ft. to a well or spring.

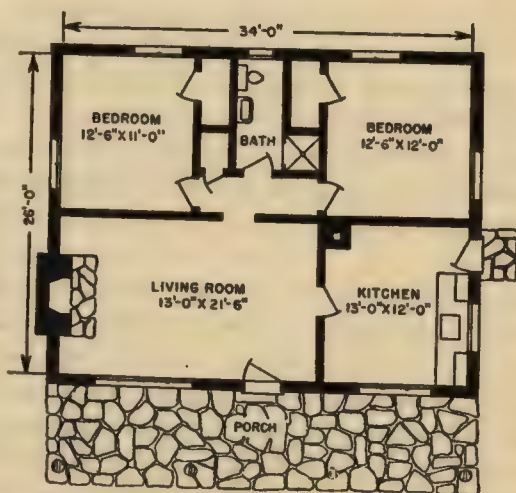
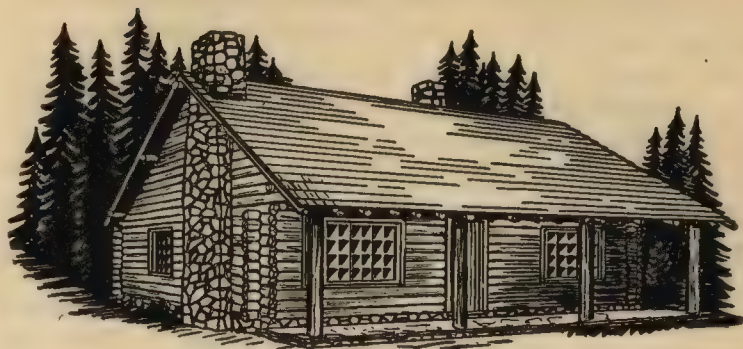
Gaudy colors are not permitted on cabins when they are in a position where they can be seen by forest visitors. This is in keeping with the general idea of presenting a true woodland scene to the visitor. Likewise, there are regulations concerning the erection of signs, house numerals, and the like. Rustic numerals and name plates are preferable. Commercial signs cannot be put up without special authorization. Keeping chickens, horses, or milk cows is prohibited.

Forestry officials, in carrying out their plans for preserving the rustic scene, favor cabins of real logs, when such material is available; board-and-batten cabins when soundly constructed; shingle-covered frame cabins, and those using log-cabin siding. In short, any cabin that is well-built and reasonably conservative in design and color scheme will be acceptable.

When log-cabin material is available, permit owners may get authorization from the Forest Service to cut trees at the commercial rate for such standing timber. However, it has been the experience of forest officials that the genuine log cabin usually is more costly than frame types except in regions where sawn lumber is not available. The tree may be available for a very low price, but the cost of cutting it and transporting it to the cabin site will be considerable in most cases.

Permission is granted to cut trees on the cabin site only when the trees are distinct menaces to life and property, obstruct vistas, or interfere with desirable breezes. Small trees are not to be stripped of their limbs near the ground, but only should be cleared of dead branches. The general landscaping of the cabin lot should be carried out with the idea of producing a natural appearance. Forestry officials encourage the growing of shrubs or bushes that serve as screens to separate the cabin from others and from roads

SUMMER HOMES IN NATIONAL FORESTS



This is a sample type of log-cabin summer home suggested for the National Forests of the Rocky Mountain Region. It could, of course, be erected in other parts of the country. (*Courtesy, U. S. Forest Service*)

and streams. Frequently these screen-forming plants can be transplanted from other parts of the lot. Regulation is exercised over appearance of fences, particularly when the cabin is near a well-traveled trail or road. Barbed-wire fences are not permitted.

CABINS AND RANCH HOUSES

In order to see that the regulations are obeyed, that the cabin and site are kept in an attractive and sanitary condition, forestry officials pay inspection visits at least once every year. Continued failure to live up to the regulations will result in cancellation of the summer-home permit.

Although the land remains the property of Uncle Sam, the cabin belongs to the permit holder who built it. In some states, taxes are levied upon cabins, but not upon the land. The holder of a special-use permit merely pays the required fee each year, in order to renew his permit. Term permits are renewable as long as regulations are not violated. The permit holder may obtain government sanction to transfer his permit to another person to whom he has sold the cabin and other improvements. The permit holder must present a letter or bill of sale to the forest supervisor before such transfer can be completed.

In addition to the national forests, there are various state forests in which cabin sites are available. Inquiry should be made at the state department of agriculture or similar governing body.

In some of the Eastern national forests, summer-home sites are not as plentiful as in those farther west, as the forests are smaller in area and the number of visitors from large centers of population is greater. The trend in these districts is rather towards the establishing of recreational facilities that will serve a large number of people equally. Therefore, lodges, public camp grounds, and hotels, provided for the benefit of visitors and vacationists, are much in evidence. However, numerous choice summer-home sites are made available in Eastern forests, when they will not interfere with the privileges of the majority. The large number of relatively small forest preserves extending for practically the entire length of the Appalachian Mountains offer wonderful opportunities to the inhabitants of crowded cities of the South and East. Only in the White Mountain

SUMMER HOMES IN NATIONAL FORESTS

Forest in Maine and New Hampshire are summer-home sites entirely lacking. For every other national forest, permits are issued.

National Forests of the United States are divided into regions. The Regional Forester in charge of each division is prepared to furnish detailed information concerning summer-home permits, and the authorization to establish hotels, resorts, or other commercial enterprises on government land. National Forest Regions, the states in which forest preserves in the respective regions are located, and the addresses of regional foresters are as follows:

Region 1—Northern Region, including forests in Idaho, Montana, and Washington. Regional headquarters, Federal Bldg., Missoula, Montana.

Region 2—Rocky Mountain Region, including forests in Colorado, Nebraska, Wyoming and South Dakota. Regional headquarters, Post Office Bldg., Denver 2, Colorado.

Region 3—Southwestern Region, including forests in New Mexico and Arizona. Regional headquarters, Post Office Bldg., Albuquerque, New Mexico.

Region 4—Intermountain Region, including forests in Idaho, Nevada, Utah and Wyoming. Regional headquarters, Forest Service Bldg., Ogden, Utah.

Region 5—California Region, including forests in California. Regional headquarters, 630 Sansome St., San Francisco, California.

Region 6—Pacific Northwest Region, including forests in Oregon and Washington. Regional headquarters, Post Office Bldg., Portland 8, Oregon.

Region 7—Eastern Region, including forests in Kentucky, Maine, New Hampshire, Vermont, Virginia, Pennsylvania and West Virginia. Regional headquarters, Bankers' Securities Bldg., Philadelphia 7, Pennsylvania.

Region 8—Southern Region, including forests in Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi,

CABINS AND RANCH HOUSES

North Carolina, South Carolina, Tennessee and Texas. Regional headquarters, Glenn Bldg., Atlanta 3, Georgia.

Region 9—Lake States Region, including forests in Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, North Dakota, Ohio and Wisconsin. Regional headquarters, Madison Bldg., Milwaukee 3, Wisconsin.

Region 10—Alaska Region, including forests in Alaska. Regional Headquarters, Federal and Territorial Bldg., Juneau, Alaska.

Tropical Region, including Tropical Forest Experiment Station and Caribbean National Forest; P. O. Box 577, Rio Piedras, Puerto Rico.

Regional Foresters can be reached at the headquarters addresses given.

Whether or not you go into a national forest with the intention of building a cabin, there are certain things you should do or not do in order to prevent trouble for yourself and others, and to prevent forest fires.

Chapter 23

SPECIFICATIONS AND ESTIMATES

IF YOU undertake to build a cabin or one of its relatives for someone else, it will be necessary for you to prepare specifications and an estimate of the cost of materials and labor. If you are building for yourself, it will pay you to work out carefully such a plan of action. Specifications and estimates are outlines that serve as a basis upon which to act. The one shows what materials will go into the building and explains how they will be used. The other lists the amounts and costs of these materials and of labor and other items of expense. Specifications tell the prospective builder just what he will get, and the estimate will show him approximately how much it will cost.

There is no building expert living who can estimate exactly how much a building will cost. There are so many variable factors that some guesswork will be involved. However, the estimator who has had considerable experience will be able to come reasonably near the truth. Large contracting companies employ experts who do nothing but figure probable costs. The individual who would do work for another must be his own estimator, basing his figures on current prices for labor and materials, and on his ability to anticipate results. At best, estimating is speculative in nature; but it is far better than haphazard guessing.

A contract between an owner and a builder is merely a legal instrument that binds the owner to pay so much for a certain piece of work such as the erection of a tourist home. Specifications are fundamentally a part of the contract, but

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they are more in the nature of a working outline for the contractor. They point out what he must do and how he must do it. Specifications such as the cabin builder will be preparing, either for his own use or as part of a contract, need cover only the fundamental points such as the type of cement mortar to use for fireplaces, and not go into exhaustive detail about things which are generally taken for granted.

Before making an estimate of the cost of a building project, the estimator should visit the site on which the building is to be erected. A study of this will tell him much about the probable cost of digging holes for foundation piers, hauling material to the job, etc.

Some other general suggestions for estimate-makers might include the following: Take the probable weather into consideration. The time of year will influence costs of excavating, hauling materials, etc. If men are hired for doing masonry, carpentry, or other work, they should be covered by insurance against accidents. Remember that a small job, like building a cabin, cannot be estimated as closely as a larger one where mistakes will tend to neutralize one another to some extent. In estimating the amount of sheathing required for a building, calculate all areas as if they were solid, deduct for openings, and then add about 16 per cent for floors, 22 per cent for roofs, and 18 per cent for side-walls. The same plan can be followed for shiplap siding. For flooring, add from 25 to 33 per cent to the actual area to be covered.

Suppose, for example, that you are going to build a Colonial type tourist home. You might prepare specifications and an estimate like the following. Of course you would find, when carrying out the actual work, that numerous changes could be made with advantage, and that you guessed wrong on many of the items; but you would have a useful guide to follow.

Your first task is to prepare plans showing the front, rear,

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and end elevations of the building; the floor arrangement and details of special constructional features.

Then work out the specifications. The following example is necessarily not exhaustive in nature.

Specifications for Colonial type tourist cabin:

General: Dimensions shown by plans and figures are to be followed: If there is a disagreement, the plans will be accepted as accurate.

All workmanship is to be of highest quality, and materials are to be the best available.

The owner may make alterations or changes during the progress of the work, the cost of such to be added to or subtracted from the price as required.

Foundation: The cabin will rest on concrete piers set into the ground and provided with footings extending below the frost line. Footings not less than 18 in. square, extending within 6 in. of the ground surface, and made of concrete composed of 1 part (by volume) Portland cement, 2 parts clean, sharp sand and 4 parts washed gravel. Piers not less than 1 ft. square and extending to height designated by owner. Pier concrete of same composition as footing, and reinforced with 4 vertical steel rods $\frac{1}{2}$ in. in diameter, placed 2 in. from respective corners and tied together with heavy wire at 12-in. intervals.

Excavation: In addition to holes for piers, soil will be removed when necessary so that there is a clearance of at least 6 in. beneath all parts of building.

Fireplace Foundation: The fireplace will be supported on a footing of concrete 6 in. thick and 1 ft. larger each way than the hearth. Place footing below frost line. Concrete composition same as for piers.

Fireplace and Chimney: Use good quality common brick set in cement mortar composed in proportion of one 94-lb. bag Portland cement, 9 lbs. dry hydrated lime, and 3 times their combined volume of clean, sharp sand. Flue to be lined

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with cylindrical fireclay lining having a cross-sectional area equal to $\frac{1}{10}$ area of fireplace opening. Chimney capped by brick set on edge in mortar. Fireplace lined on sides and back with firebrick. Hearth covered with cement mortar.

Lumber: All lumber, except where noted, is California redwood, well-seasoned. Sizes include:

Sills, 3 by 6, heart common.

Tops of sills, 2 by 4, heart common.

Floor joists, 2 by 6, heart common.

Plates and bridging, house and garage, 2 by 4, heart common.

Studs, 2 by 4, heart common. 18" centers in house, 2'0" centers in garage.

Rafters, 2 by 4, heart common, 2'0" centers.

All other timbers not mentioned, to be furnished in standard size and good grade.

Outside walls: The walls are of board-and-batten construction. The boards, set vertically, are 1 by 12 select or clear redwood, set with rough side out. Battens are $\frac{1}{2}$ by 2 $\frac{1}{2}$ redwood, select or clear, nailed over joints in such a manner that weather cannot enter.

Roof: Roof is covered with 1 by 4 sheathing, heart common redwood, 8" on center. Redwood shingles, laid 4 $\frac{1}{2}$ " to weather, and nailed with copper or zinc-coated nails, 4 penny shingle-nail size. Valleys and chimney to be flashed with 16-oz. sheet copper, lapped and soldered, with rosin flux, at joints. 4 by 4 redwood gutter extends along eaves.

Windows: D. H. window frames, 3'6" by 5'1", with 6-light sash, glazed, and with weights and cords. Frames shall be of standard design. Front window is to be equipped with 1 pair of stock shutters, 1'6" by 5'1".

Doors: Door jambs to be 2'6" by 6'8" by 5 $\frac{3}{8}$ ". Casings, both sides, to be 1" by 5". Entrance doorway hung with 6-panel stock door 1 $\frac{3}{4}$ " thick, with leaded glass transom. Inside doors are 1-panel, 1 $\frac{3}{8}$ " stock.

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Entrance: In front of the main doorway is a landing of common brick, laid flat in cement mortar mixed as already specified. Flanking the entrance are two lattice frames made of 2 by 2 vertical members and 1 by 1½ cross members, select or clear redwood.

Flooring: The floor throughout will be of 1 by 4 or 1 by 6 tongue-and-groove redwood, securely nailed with one 6-penny flooring brad at each bearing point. Flooring ends to be butted tightly against sidewall boards, and joint at angle sealed with ½-in. quarter-round moulding.

Inside Finishing and Fittings: Inside wall and ceiling surfaces to be covered with 1 by 12 redwood boards with moulded joints cut as shown in detail B. All door openings to be trimmed with plain 1 by 5 casings. Window casings to match door casings. Build medicine cabinet 1'2" by 1'8"—6" deep, with mirror in door; spice cabinet 1'10" by 3'0"—4" deep, single panel door; two kitchen cabinets 2'0" by 3'6"—12" deep, single panel doors. Install stock drainboard 1'10" by 2'6" by 1½", sugar pine. Run 1 by 4 moulding cut to detail A, around room in angle between sidewalls and ceiling. All interior finish to be best grade clear redwood, kiln-dried and finished smooth. Leave living room walls and ceiling natural redwood finish. Apply two coats white paint to bath and kitchen walls. Finish all floors two coats floor paint, dark olive green. Nail holes in painted surfaces to be puttied after prime coat is applied.

Outside Finish: Apply 2 coats dark green stain to roof, lattice and shutters. Board and battens, door and sash, two coats white lead and oil.

The foregoing specifications could, of course, be expanded to include greater detail. Only some of the essential items have been listed, others being omitted because of space restrictions. Additional divisions that would enable everyone concerned to get a clearer picture of the proposed building might include cellar excavation and floor construction (in

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buildings where a cellar is used) ; details of automobile shed corner posts and other parts; cornice construction; screens and blinds for windows; plumbing, including water supply and sewage disposal facilities; heating equipment, etc.

From the specifications, plans, materials list, local labor conditions, nature of the site, and other conditions influencing costs, the builder next prepares an estimate. This estimate is his personal calculation of the probable cost of the tourist home. He bases it upon all the data available, and does not begin its preparation until all facts are at hand. To the computed cost he adds a percentage for profit and for unexpected expenses. The profit will vary, and can be based on prevailing practice in the area where the building is to be done.

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